

American Artisan

and Hardware Record

Sheet Metal Work—Warming and Heating

Vol. 94, No. 14

CHICAGO, OCTOBER 1, 1927

\$2.00 Per Year

Library of Congress
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New Milcor Warehouse at corner of Western Avenue, Bond and 44th Street, Chicago. Truck deliveries throughout Chicago Sector. On the private siding served by Chicago Junction Railway and Pennsylvania Railroad, connecting directly with all railways entering Chicago.

Milcor's New Chicago Plant

WITH this announcement of the opening of our new Chicago Home, we repeat the Milcor pledge of service:—

To keep Milcor facilities more than adequate to insure the speediest service you require, has been our constant aim through a quarter of a century of manufacturing for the sheet metal trade.

You have shown that you appreciate Milcor quality and service. This important step toward still better service is impressive evidence that we also appreciate your enthusiastic patronage, and that you can depend on Milcor to hold to its pledge.

MILWAUKEE CORRUGATING COMPANY
Milwaukee, Wisconsin
Chicago, Ill. Kansas City, Mo. La Crosse, Wis.

MILCOR

The Furnace With the One Piece Radiator

Vernois

NOTE These Features

One Piece Radiator

The radiator is of special design and is cast in one piece, eliminating all joints and rendering it absolutely dust proof and smoke proof. The smooth interior, free from crevices and irregularities offers no lodging place for soot and permits perfect circulation at all times.

Lock-Cup Joints

The unusual design of the joints makes them perfectly tight — air tight and dust proof. The deep grooves and wide flange prevent the asbestos cement from cracking and coming out and insure a permanent joint.



NOTE These Features

Round Shaker Grate

with upright shaking lever. This heavy cast iron grate rides upon large steel ball bearings, insuring easy operation at all times. The center dump makes the removal of ashes a simple matter, while the upright shaking lever gives greater leverage and eliminates stooping.

Triangular Anti-Clinker Grates

may be had in place of the above if preferred. They are of heavy, heat resisting cast iron. No tools are required for their removal — no grate rings to burn out — and the fire does not touch the grate supports at any place.

VERNOIS Furnaces have always been abreast of the times—up to the minute in every way—the best values that can be produced. With the new One Piece Radiator feature, Vernois Furnaces again step out ahead of competition.

This new feature is the result of months of careful study—of research work and experimenting. And it has been tested and proven in every way. Vernois high standard of quality is carefully maintained in the selection of materials. Special heat resisting cast iron is used, and all parts subject to intense heat or exceptional strain are made proportionately heavier so as to allow no weak spots.

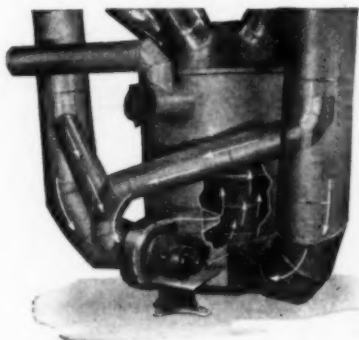
Vernois Furnaces are made to give lasting satisfaction, and thousands of satisfied users testify to the fact that they live up to this aim.

In the same proportion, hundreds of enthusiastic Vernois dealers are profiting every year from the Vernois line.

If you are not cashing in on Vernois popularity, write today for prices and catalog.

WRITE TODAY FOR ILLUSTRATED CATALOG

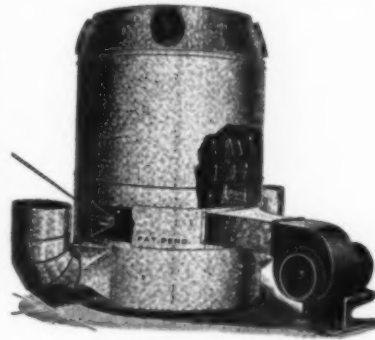
Mt. Vernon Furnace & Mfg. Co.
Mt. Vernon Ill.



THE HEAT-O BOOSTER draws cold air directly from rooms or return air pipes. Air is discharged directly and uniformly against the hottest parts of the furnace, extracting more heat units. The BOOSTER overcomes resistance, insures even distribution of heat, heavy firing is unnecessary, prevents overheating of furnace, effects fuel economy.



SUCCESSFUL, because it is designed by men who have spent their lives in the furnace industry. Developed because of a real need for something different and better in warm air heating. Wherever HEAT-O BOOSTERS are sold, owners are satisfied and become boosters for warm air, and dealers make money.



HEATING efficiency depends on the amount of heat that the air absorbs from the furnace. Note how the air is blown directly against and over the heated surfaces. The HEAT-O BOOSTER picks up four times the usual number of heat units and also guards against the furnace becoming overheated. Install HEAT-O BOOSTERS and *guarantee results.*

A COMPLETE FAN-FURNACE LINE

REGARDLESS of the kind of furnace heating problem you have, you can solve it with the HEAT-O LINE of furnace fans and boosters because the line is *complete*.

No longer need you steer clear of jobs that appear to present too many difficulties if heated by gravity. Today, with the HEAT-O LINE, you are equipped to go out and sell installations which ordinarily you would pass up.

Guesswork is eliminated when you use the HEAT-O LINE. When we recommend a fan or booster installation, we take no chances—neither do you. Installation expense is kept to the minimum, positive heating is guaranteed, and at an operating cost that is astonishingly low.

HEAT-O fans and boosters should not be confused

with ordinary furnace fan equipment. They are of original and distinctive design, the result of years of experience in solving furnace heating problems, and are made of only the very best materials, which will give many years of efficient, economical operation.

Use this *complete* heating service for every type of building that can be heated by furnaces—Homes, Stores, Factories, Churches, Garages, etc., etc. There is no reason why any of this work should get away from you. Profitable furnace business is being done today by hundreds of dealers because they are going after it on the HEAT-O plan.

Cash in on this opportunity NOW. Our sales and engineering help is yours for the asking. Write for catalog and full particulars to:

ROBINSON FURNACE COMPANY

205-7 West Lake Street

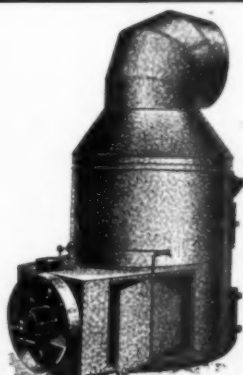
Heating Systems Division

Chicago, Illinois

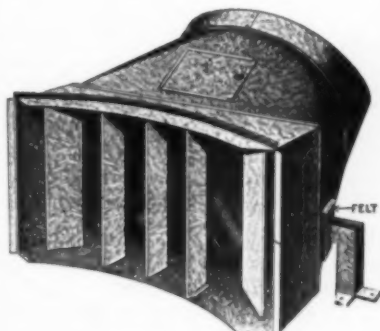
BUILT TO FIT ANY WARM AIR FURNACE



STYLE A BOOSTER. This equipment is rapidly broadening the field of gravity warm air heating. This original idea in fan-furnace work gives instant, constant and economical heat; positive circulation, fuel economy. Designed by furnace engineers who can point to hundreds of satisfactory jobs. HEAT-O installations are making good.



STYLE H UNIT HEATER. This direct-fired unit, equipped with a propeller type fan, is the ideal system for churches, schools, shops, factories, garages, etc. Fan delivers large volume of air to furnace with minimum friction, sufficient velocity to insure positive circulation and uniform distribution of heat. Wonderful sales possibilities.



STYLE C BOOSTER. A propeller type furnace fan, designed to increase circulation. The equal of any similar equipment on the market. Where this is used, all cold air supply should be combined into one return at the furnace. If this is impractical, Style A is recommended. Sold complete, ready to install.

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ARE you a good furnace salesman? Then you need a furnace worthy of your ability.

If you are not, think of the advantage in selling a furnace better than that of any of your competitors.

The new Series "C" is that better furnace, worthy of the best dealers and a sure means of increasing the business of any dealer.

*Write for the
business building,
money making
details.*

The HENRY FURNACE & FOUNDRY CO.

3471 E. 49th St. Cleveland, Ohio

Distributors:

Carr Supply Co., 412 No. Dearborn St., Chicago, Ill.

Johnson Furnace Co., Kansas City, Mo.

Moncrief Furnace Co., Atlanta, Ga.

Moncrief Furnace & Mfg. Co., Dallas, Texas

E. W. Burbank Seed Co., 29 Free St., Portland, Me.

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MONCRIEF FURNACES

THE ATH-A-NOR FURNACE

PIPE AND PIPELESS



The Secret of Success in the Warm Air Heating Business

is the same as the secret of success in any other business and just as simple.

All you need is Quality merchandise, the best class of installation and some sales ability.

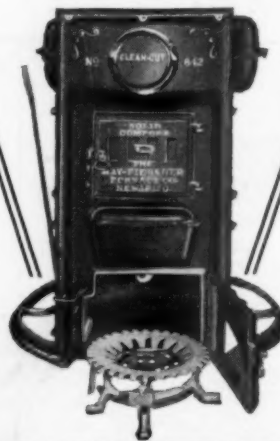
Some dealers because they are weak on selling good warm air heating try to build a business with inferior furnaces, cheaper prices and skimpy installations.

It can't be done.

Let us show you why ATH-A-NOR quality furnaces give you more selling points as well as better quality.

Let us show you why YOU CAN SELL better warm air heating with the ATH-A-NOR line—let us work with you to help you build your business on the right foundation.

*ATH-A-NOR furnaces are famous for
their THREE-WAY AIR BLAST. Write
for full details about this and other
ATH-A-NOR features*



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Newark, Ohio

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Whichever you recommend to your customer—either the flat, boiler-type grate with waist-high shaker, or the triangular, revolving anti-clinker grate.

In either case, you have the frameless, dust-proof ashpit door, and every other special feature of the SUPERIOR furnace.

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365 E. ILLINOIS ST. CHICAGO, ILL.
Makers of Superior Pipe and New Idea Pipeless Furnaces
Division of NATIONAL RADIATOR CORPORATION



SUPERIOR WARM AIR FURNACE

SUPERIOR DEALERS ARE EXCEPTIONALLY LOYAL — Why?

One-Piece Radiator

a feature of the

"Western"
boiler plate

Important Points are

One piece side wall construction.
Unusually large size.
Braced Support counteracting expansion and contraction.
Two or three flue travel.
Rust proof bottom of galvanized steel.
Collar connections have telescope joint, asbestos packed.

The Western Furnace has many other practical features of design which make it an unusually easy and satisfactory heater to sell. Among them are the top, corrugated to take up expansion and contraction, one-piece body construction without rivets on front extension, and heavy double grates which are easily shaken from a standing position.

Western Dealers have the benefit of long profits, easy terms, also selling and advertising helps.

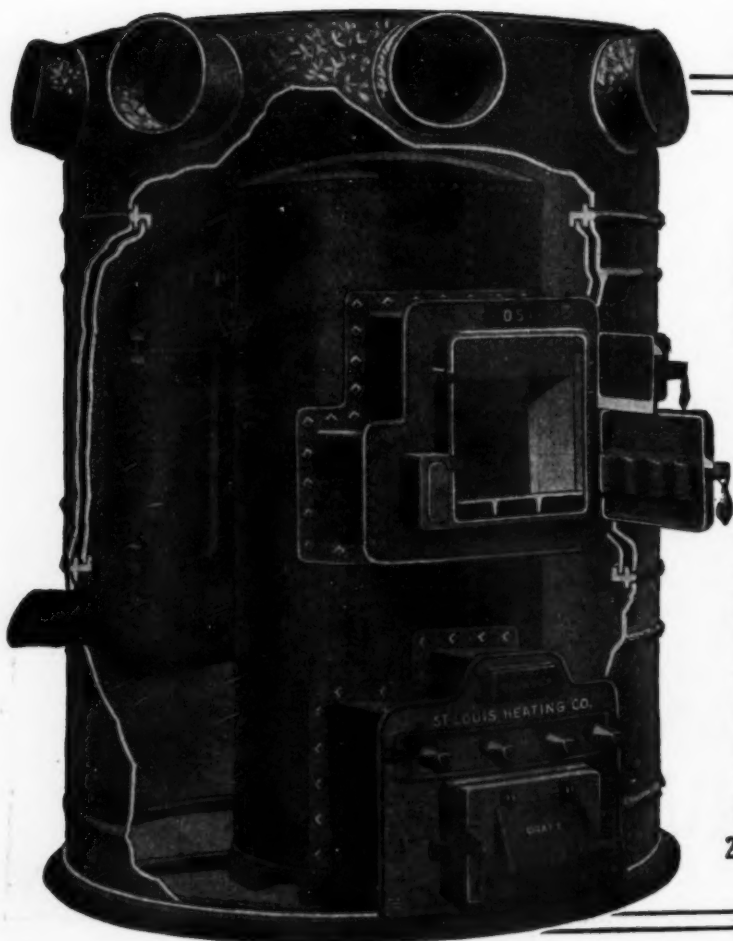
WESTERN STEEL PRODUCTS CO.

130 Commonwealth Ave.,
DULUTH, MINNESOTA, U. S. A.

Distributed by:

Atlanta, Ga. Moncrief Furnace Company
Pittsburgh, Pa. Wagener-Prole Furnace Company
San Francisco, Calif. Pacific Sheet Metal & Furnace Co.
Ravenna, Ohio. Ravenna Furnace Company
Chicago. Western Steel Products Co., 3025 W. Van Buren St.

Mention AMERICAN ARTISAN in your reply—Thank you!



**Only real quality
can make real
profits for you—**

AND when you decide to sell steel furnaces, which you will some day, remember that the construction of the furnaces illustrated here has the features of construction that have made

"HOME COMFORT"
(TRADE MARK REGISTERED)
Steel Furnaces

famous favorites for over half century

True their construction has changed with time, but only when real quality features could be added. Recent improvements on Home Comfort furnaces have increased their heating surfaces and made them more efficient and economical consumers of fuel. (Notice the gas and soot consuming features shown on the feed door.)

We have a special circular called "A Dozen Appeals to Reason" which points out some of the "Home Comfort" features. Write for it today.

ST. LOUIS HEATING CO.
2901-11 Elliot Ave., St. Louis, Mo.

PITTSBURGH DISTRIBUTOR
Wagener Bros., 2605 East Street



A high quality furnace designed according to the Standard Code requirements for Standard Code installations

**The NEW FLORAL CITY
QUEEN FURNACE**

THE size of the casing and the relation of radiating surface to grate area have been carefully figured out according to the Standard Code and the ratings on this furnace are also as determined by the Code. That's a good selling point to make along with your Code installation—a real Code furnace.

Here are Some of the New Features:

1. Large one-piece cast radiator with extra large opening from combustion chamber with direct-indirect draft damper.
2. Smoke and cleanout collar extend through the casing and front. Throats of feed door and ash pit extend through front and both doors and throat are disc ground to insure perfect fit.
3. Only four joints inside casing and these joints are extra deep covered joints.
4. Extra large water pan—lever shaker handle—rocker type grates—heavy ribbed two-section straight fire pot—large one-piece roomy ash pit and other improvements.

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DFTROIT BRANCH
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Industry is to be found in this Journal every week.**

This is the only trade Journal covering this field published every week.

American Self-Cleaning Furnace

An Efficient Warm Air Furnace

Highly Improved



HERE is the warm air furnace that householders have been looking for. The cleaning feature insures delivery of the maximum amount of heat from the fuel burned.

There are many superior mechanical features about the American Self Cleaning Furnace which will make it a leader in your community.

Superior Features

1. Covered Joints Throughout
2. Large Upright Shaker
3. Duplex Shaking and Dumping Grates
4. Large Fuel Door
5. Extra Heavy Construction

Orders received in the morning mail shipped the same day

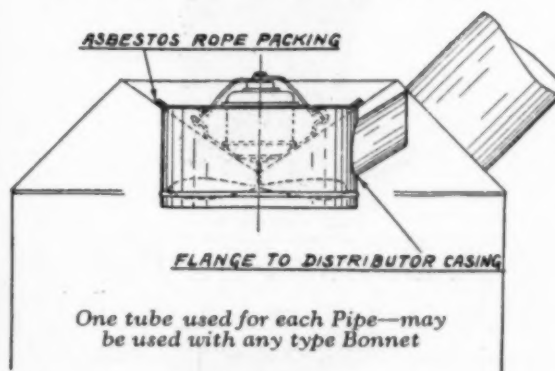
Write for Catalog and Prices

American Foundry & Furnace Co.

Dept. 400

Bloomington, Ill.

Forced Air Heating is Simple and Efficient with the ROBINSON Heat Distributor



Notice--forcing is flexible--directed to the pipe desired and as much as needed--

THE tube sizes leading to the heater pipes are measured according to the requirements of each individual pipe—tubes ranging from three to five inches may be used.

The ROBINSON Heat Distributor is equipped with a three-speed motor, giving an air delivery of 800, 1350 and 1500 Cubic Feet of Air Per Minute.

The ROBINSON Heat Distributor is easily installed in *any type bonnet*.

This is the Forced Air Unit being used by live dealers everywhere—write for construction details **NOW**.

* *Write for prices and installation directions today.*

The A. H. ROBINSON CO.
MASSILLON, OHIO

*The large increase
in Wise business
has again proved
Wise leadership in
bringing out—*



WISE OPEN DOME
CAST FURNACE

A Better Fire Pot



WISE 20 SERIES CAST
FURNACE

A Better Radiator



WISE STEEL FURNACE

A Better Steel Furnace

FIND out now all about the Better Wise Steel Furnace and the big improvements on the famous Wise Cast Furnaces—Write for special broadsides and our new Catalog No. 23, just off the press, which illustrate and describe Wise furnaces and these new improvements in detail.

The Wise Furnace Company
AKRON, OHIO

REX AUXILIARY GAS FURNACES



*Just what
hundreds of
your custom-
ers want—*

REX Auxiliary Gas Furnaces are being sold everywhere *fast* because they fit a need that makes *efficient* and *economical* heating a fact.

The No. 380 REX Auxiliary shown herewith when connected to a coal furnace will heat 5 to 7 rooms without the use of coal furnace.

You can burn both at the same time or either separately.

RIGHT NOW THERE IS A MARKET WAITING IN YOUR TERRITORY FOR REX AUXILIARY GAS FURNACES—THEY BURN EITHER NATURAL OR ARTIFICIAL GAS AND ARE SOLD WITH OR WITHOUT CASING.


REX Auxiliary Gas Furnaces are made in two sizes—the No. 380 illustrated has two 20 inch burners and pilot equipped with Hale adjustable mixers.

The agency for REX Auxiliary Gas Furnaces will bring you big profits—Write for our complete catalog today.


CALKINS & PEARCE

751 E. Long St.,

COLUMBUS, OHIO



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WE MANUFACTURE A COMPLETE LINE OF BOLT PRODUCTS, INCLUDING STOVE BOLTS, CARRIAGE BOLTS, MACHINE BOLTS, LAG BOLTS, NUTS, COTTER PINS, ETC. ALSO STOVE RODS, SMALL RIVETS AND HINGE PINS. CATALOG ON REQUEST.

THE LAMSON & SESSIONS CO.
THE KIRK-LATTY CO.
1971 W. 85th St. Cleveland, O.

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264 Pages
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Postpaid

A book that deals with the different types of furnaces, their construction, proper location and setting together with furnace fittings. It is the standard authority.

This new edition contains a chapter covering the main features of one pipe or pipeless furnace heating, which has become a big factor in warm air heating.

Contents—Furnaces: House Heating, Combination Systems; Air, Heating and Ventilation of School Buildings; Heating of Public Buildings, Churches and Stores; Fan Furnace Combination System; Temperature Control; Estimates and Contracts, Fuels; Miscellaneous Tables and Data; Furnace Fittings; Miscellaneous Notes, from Various Sources on Furnace Heating.

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Chicago, Illinois

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CHICAGO

For the West

IN our Eastern and Western warehouses we carry a stock of warm air registers, cold air faces and ventilators that is, perhaps, the largest in this country. From these points, H. & C. customers can always be certain of prompt shipment, whether the order be for a single piece or a carload.



**NEW
BRITAIN**

For the East

THE HART & COOLEY MFG. CO., NEW BRITAIN, CONN.

Manufacturers of Registers, Wrought Grilles and Radiator Enclosures

New York
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Philadelphia
Real Estate Trust Building

(WESTERN WAREHOUSE AT CHICAGO)

WROUGHT
STEEL



H&C

WARM AIR
REGISTERS

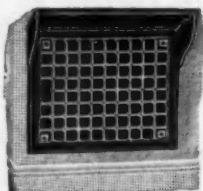
"The Air Capacity Line"



"GEM"
ADJUSTABLE
REGISTER
SHIELDS

Permanent Oxidized Copper Finish

SELL them to all homes heated by warm air. "GEM" Register Shields are durable and attractive. They are easily adjustable. They save fuel and protect walls. They fit all size registers.



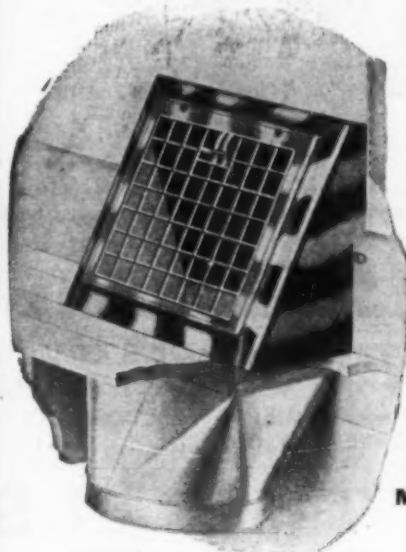
Floor Shield retails at \$1.50. Wall Shield at 75c.

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Your Mechanics' Time*



Cutting
Sills, Joists
and
Studding

*The Out-O-Wall Register
saves all that
by setting
against the
wall.*

Only a hole in
floor and base
to set it.

Mail Now!

Everyone needs the
OUT-O-WALL REGISTER

Rock Island
Register Co.

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R. I.
Register Co.
Rock Island,
Illinois

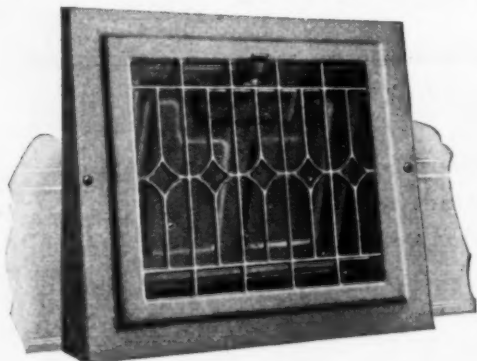
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prices and in-
formation on Out-O-
Wall Registers.

Name.....

Address.....

AA

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combined with attractive design

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New York State Branch

Rochester, N. Y.

**EASY
TO INSTALL**

CLAMPS
ON
NO
BOLTS

REVERSIBLE

**CUTS
LABOR 1/3**

**EASY TO
REMOVE**

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JOINT**

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TEELA SHEET METAL CO. — OSHKOSH, WIS.

the NEW TEELA

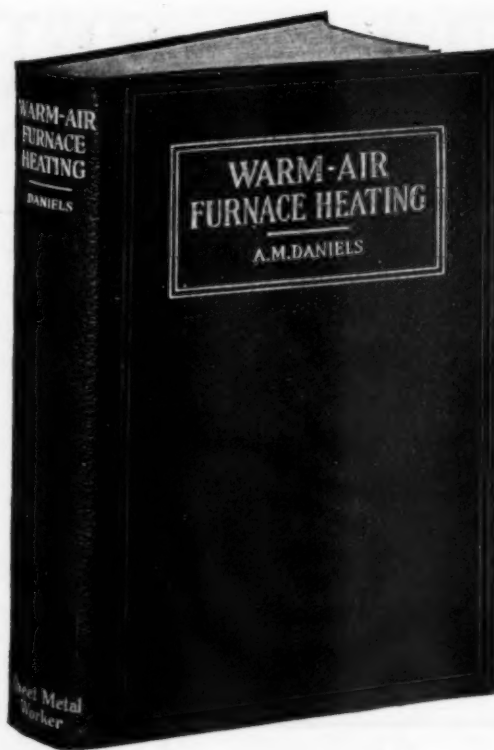
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REVERSIBLE
CHECK DRAFT**

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THE CLEVELAND CASTINGS PATTERN COMPANY
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FOR STOVES AND HEATERS FIRST-CLASS
IN WOOD and IRON
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**IRON AND WOOD
STOVE PATTERNS**
QUINCY PATTERN COMPANY
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Here is the book they are all talking about—

Just off the Press—Now ready for you

IT IS the book that you have been asking for—a book on Warm Air Furnace Heating that is UP-TO-DATE—a book that covers every phase of the subject giving exact data based on research work.

Written by A. M. Daniels.

Here is the book that will enable both the experienced furnace man and the student to obtain a working knowledge of up-to-date scientific warm air furnace heating.

It covers the subject completely.

Many tables are included and some big labor savers in calculating pipe sizes—also many diagrams.

450 pages, 7x9 inches

*Bound in semi-flexible imitation leather—
Stamped in gold—*

PRICE \$5.00 POSTPAID

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Enclosed find \$5.00 for which send me WARM AIR FURNACE HEATING by A. M. DANIELS.
10% discount allowed on book and renewal subscription if ordered together.

Name

Street Number

Town State

Who will get the Heating contract for your town's new big school?

IS it too big for you to consider heating it with warm air?

IT ISN'T—

We are Warm Air Heating Engineers and specialize in heating schools and other large buildings by FAN BLAST warm air heating and land big jobs every day—That's our business.

We are in the same business you are in only we maintain a staff of Warm Air Heating Engineers.

Now then you can use our staff also on a fee basis. This means you can ask to bid on all the big heating jobs in your town that will call for Fan Blast Heating.

You know the school board, the mayor, etc.

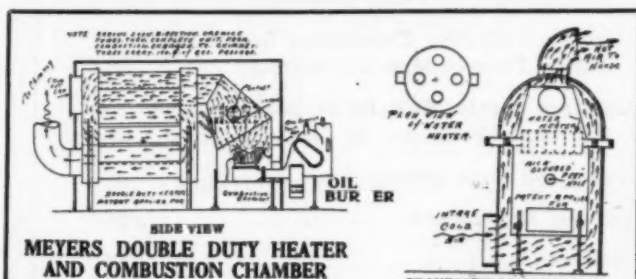
You know that the new school will be heated better by warm air but heretofore it was too big an undertaking for you. Now you can sell warm air heating to the school board and send the plans to us—we act as Your Engineering Department.

We are interested in working with only the larger and most progressive dealers who are able to put in big fan blast jobs after we plan them.

HERBERT H. DAVIS CO.

4146 South Western Ave.

Chicago, Illinois



MEYERS DOUBLE DUTY HEATER AND COMBUSTION CHAMBER

Fig. 1 shows combined fuel saving unit with burner in place. Arrows indicate volume of heated gases at top of fuel saver and small amount escaping into chimney.

Fig. 2 shows air flowing in at the bottom and up around the furnace and tubes to rooms above.

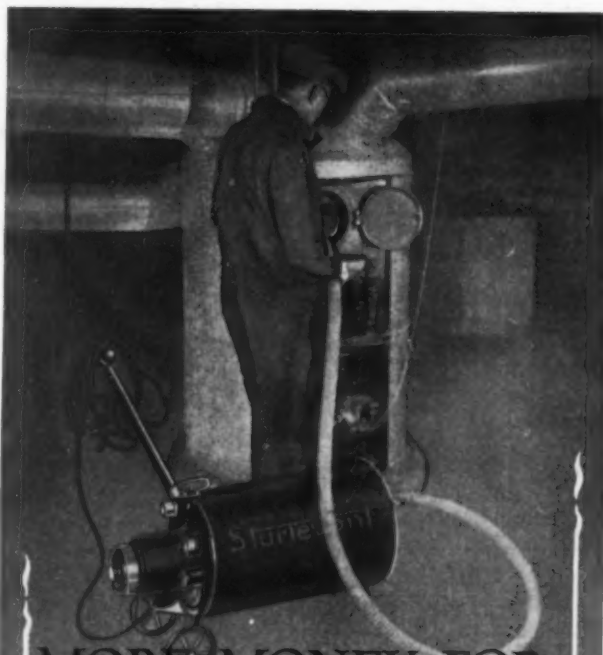
IF THEY DON'T BUY IT, THEY PAY FOR IT, ANYWAY!
We get every heat unit and put it to work . . . People can burn oil now cheaper than coal . . . We have a real money-maker for you, Mr. Dealer . . . Heat TWO apartments for the cost of ONE.

MEYERS FUEL SAVER CO., Inc. Janesville, Wis.

REPAIRS

for STOVES-FURNACES-BOILERS

Send for our illustrated Order Blanks
NORTHWESTERN STOVE REPAIR CO. CHICAGO-ILLINOIS



MORE MONEY FOR FURNACE MEN

Clean Furnaces this QUICK WAY

THERE'S more furnace business for you—right in your own community. You can get it with very little effort. The Sturtevant Furnace Vacuum Cleaner opens the way—cleans furnaces quickly and thoroughly—no dust, no dirt

Now is the time to go after furnace cleaning business—while fires are out. Every house owner in your community is a prospect. Offer them this vacuum cleaning service. It will give you not only a chance to make a reasonable profit on the cleaning but the opportunity to look over heating plants and make recommendations for repairs. In some cases new furnaces will be needed and you'll stand a good-chance of making the sale.

Don't overlook this opportunity to increase your profits. The Sturtevant Furnace Vacuum Cleaner is the quickest and most thorough furnace cleaning device on the market. Send in the coupon NOW for further information.

Sturtevant

HYDE PARK, BOSTON, MASS.
B. F. Sturtevant Company, Dept. FC7
Hyde Park, Boston, Mass.

Without obligation to me, send along further information and price on the Sturtevant Portable Furnace Cleaner.

Name _____

Address _____

City _____ State _____

Founded 1880

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Better
Warm Air Heating
and
Sheet Metal Work

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United States.....\$2.00
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Published EVERY SATURDAY at 620 South Michigan Avenue, Chicago

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Vol. 94, No. 14

CHICAGO, OCTOBER 1, 1927

\$2.00 Per Year

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Unsell Yourself That Business Is Bad

Elbert Hubbard used to tell the story of a naturalist who divided an aquarium with a glass partition, putting a bass in one end and minnows in the other. Every time a minnow approached the glass partition, the bass struck. But after three days of bruising his nose, he gave it up and merely took the food that was given to him. Though the naturalist removed the glass partition and the minnows swam around him, the bass paid no attention to them, because he had been sold on the idea that business was bad. Occasionally we hear of salesmen who need to try another strike. As a matter of fact, the partition has been removed for some time. There are orders on all sides for those who go after them.

B U S I N E S S

THE first definition of the word "business" in the dictionary is this—the "**quality or state of being busy.**"

That surely means that first, we must be **busy minded**, and second, **physically busy at all times**—if we wish to keep business and make our business grow.

To state that business is "off" is to imply that our busy mindedness and state of being busy are slacking also.

To state that people are not buying may at times be correct, but is it not true that at such times we should increase our activity toward making business improve—by displaying more of **the quality and state of being busy.**

When folks don't buy at a time when money is plentiful, **as it is now**, the answer lies with us who have something to sell.

It means that the public has more than caught up with us—they are buying from those who are busy enough to **sell.**

If you are a retailer you have but to look about you to see that

some merchants are very busy—that the public has money but that they are buying from those who are **intensively selling.**

If you are a manufacturer, you know that some industries are busier than ever before—and what industries are they?

We are in a staple industry—an industry that supplies **life's necessities** and if the public has money our industry should be all that **we can make it.**

Are we **selling** enough?

Have we been too used to seeing business **fall** our way?

The dealer is the manufacturer's outlet—he must be **sold** and he must be **sold on selling.**

He must be **kept** sold on the business he is in and the products he sells.

The **selling** dealer is the man who **reads business papers**—he is the type of man who possesses **the quality and state of being busy.**

He is the type of man who **sells** and can be **sold at all times.**

AMERICAN ARTISAN

Speaking About "Setting 'Em Up"



A FURNACE can be designed and manufactured under the most exact and rigid engineering principles, but if the installation is done in a slipshod, matter-of-fact manner, the efforts of the furnace manufacturer have gone for naught.

First of all, in mounting a furnace, the practical furnace man should closely examine the cup joints. If the castings have been exposed to dampness, perhaps rust has accumulated, or there may be dirt or grease in the channels. Be sure to clean this out thoroughly, using a wire brush if the castings are rusty and wipe out with a damp cloth. Remember that furnace cement will not adhere properly to a dirty joint.

Fill the cup joints full and avoid air pockets by firmly pressing the cement against the sides of the cup. As the fire pot and feed sections are laid on one by one, smooth off the cement on the inside and bevel the cement on the outside. When the radiator is in place, see that the cement on the outside is flush with the top of the cup.

Careful workmanship in the erection and mounting of a furnace assures efficiency and efficiency means satisfaction.

THE ARMSTRONG COMPANY
DETROIT **MICHIGAN**

Manufacturers of

"THARCO" ASBESTOS FURNACE CEMENT

*Look for
the directions on
our cans.*

*"In the Interest of
Better Warm Air Heating"*

*Look for our
article in the
November 5th issue.*



American Artisan and Hardware Record



Vol. 94

CHICAGO, OCTOBER 1, 1927

No. 14

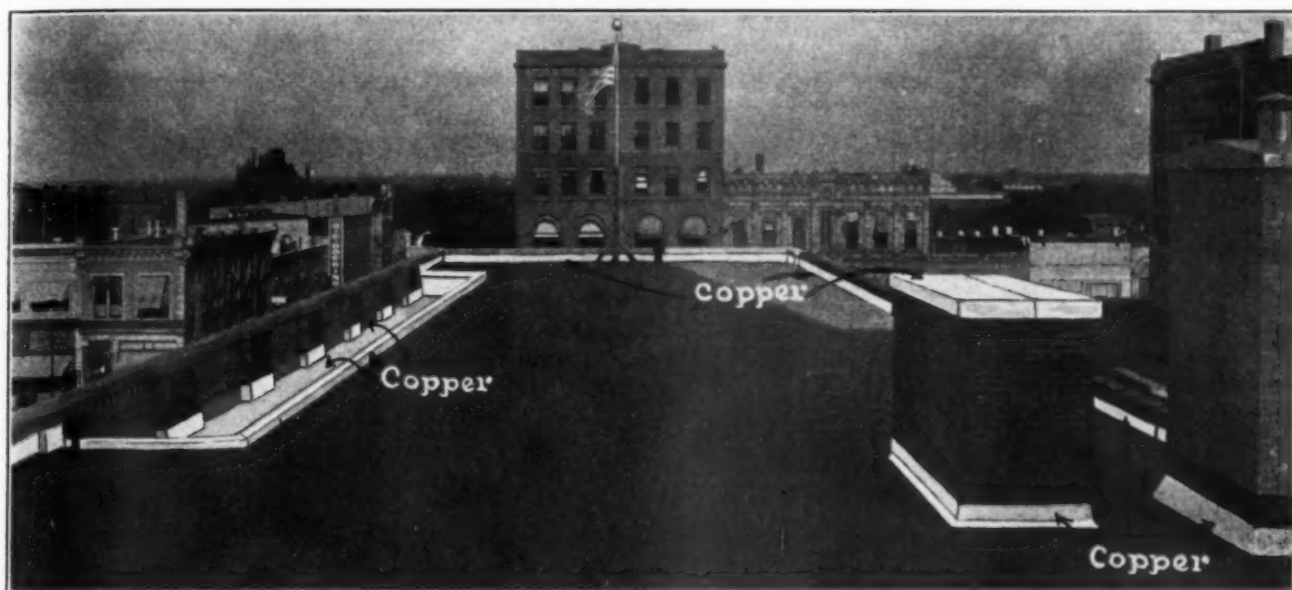


Figure 1.—Roof of Central National Bank Building, Topeka, Kansas, Showing How and Where Copper was Used in Loose Trough Gutters

Loose Trough Copper Guttering Insures Topeka Bank Interior Against Water Damage

*Louis Van Dorp & Sons, Topeka, Kansas,
Sheet Metal Contractors Do Fine Job**

By HARVEY A. CALL

INTRODUCING a nice — well splendid job of copper work on the Central National Bank Building of Topeka, Kansas. Wight & Wight of Kansas City designed the building; F. M. Spencer & Son of Topeka, built it; Louis Van Dorp & Sons of Topeka installed the copper work on it. Right here I am going on record as telling you—fellows, that copper job is sure a “pippin.”

The roof, completely surrounded by fire and parapet walls, of the

building is flat with, but a slight pitch toward the deep gutter shown in Fig. 1. Naturally metal of some sort was necessary for the lining of the gutter, and copper was chosen because of its durability which made it possible to give permanence to that part of the roof. Incidentally permanent freedom from leaks, here, as in thousands of other problems faced by sheet metal contractors was and is of paramount importance, because in this, as in other similar cases, leaks would immediately register damage to the interior structure and decorations of the building.

Great credit is therefore due to the firm of Louis Van Dorp & Sons, sheet metal contractors of Topeka, Kansas, for the splendid workmanship and method which was used in installing the metal on this job. For, after all, roof work is weak in proportion as the metals and design are poor and the workmanship careless or bad.

This gutter and all gutters of similar design present two problems. First to install a lining which will be water tight. Second to install a lining which will stay water tight. No comment on that is necessary, as every competent sheet metal

*Harvey A. Call is the Mid-west branch manager of the Copper & Brass Research Association, located at 901 Landreth Building, St. Louis, Missouri.



Figure 2.—Completed Structure of Central National Bank, Topeka, Kansas, Upon Which Louis Van Dorp & Sons, Topeka Sheet Metal Contractors, Did the Copper Work

worker knows which of the two is most essential and likewise hardest to achieve. To accomplish both Van Dorp & Sons used the unique method illustrated by Fig. 1 and shown in section by Fig. 3.

The first step in doing the job was to have the builder raise the upper sheathing slope so as to give a vertical drop at point "A" shown in Fig. 3. This permitted of using a loose pan or trough extending the full length of the gutter, in shape outlined by points 1-2-3-4-5 and 6 on Fig. 3. This pan or trough, built of 16-ounce copper, was made on the roof so that it could be turned and all of the seams thoroughly sweated with solder while in a flat

or horizontal position. Every seam and all parts of every seam were in that way thoroughly sweated with solder.

The trough or pan—some 6 inches shorter than the gutter opening to allow for expansion and contraction of the metal—was then slid into position and the upper or building side edge worked into shape so that it would come up to the top of the vertical rise at "A" where it turned out at right angles to form one member of a loose locked seam at that point. This member was also used to fasten the top edge with cleats nailed to the raised sheathing at that point. The outside wall edge was then cap flashed with a copper

flashing, 16-ounce, extending entirely across parapet wall and well down below the top of the vertical edge of trough at inside of wall. In that way freedom of movement was assured for that edge of the trough.

Above the trough on the building side the raised sheathing extends up on a relatively steep slope for about 3 feet to reach the roof level. The copper on this slope was put on by the standing seam method with copper cleats and copper nails. The seams were flattened at the top to allow for the bend at roof intersection. They were also flattened at the bottom so that the lower edge could be folded to engage the upper member of the trough in forming

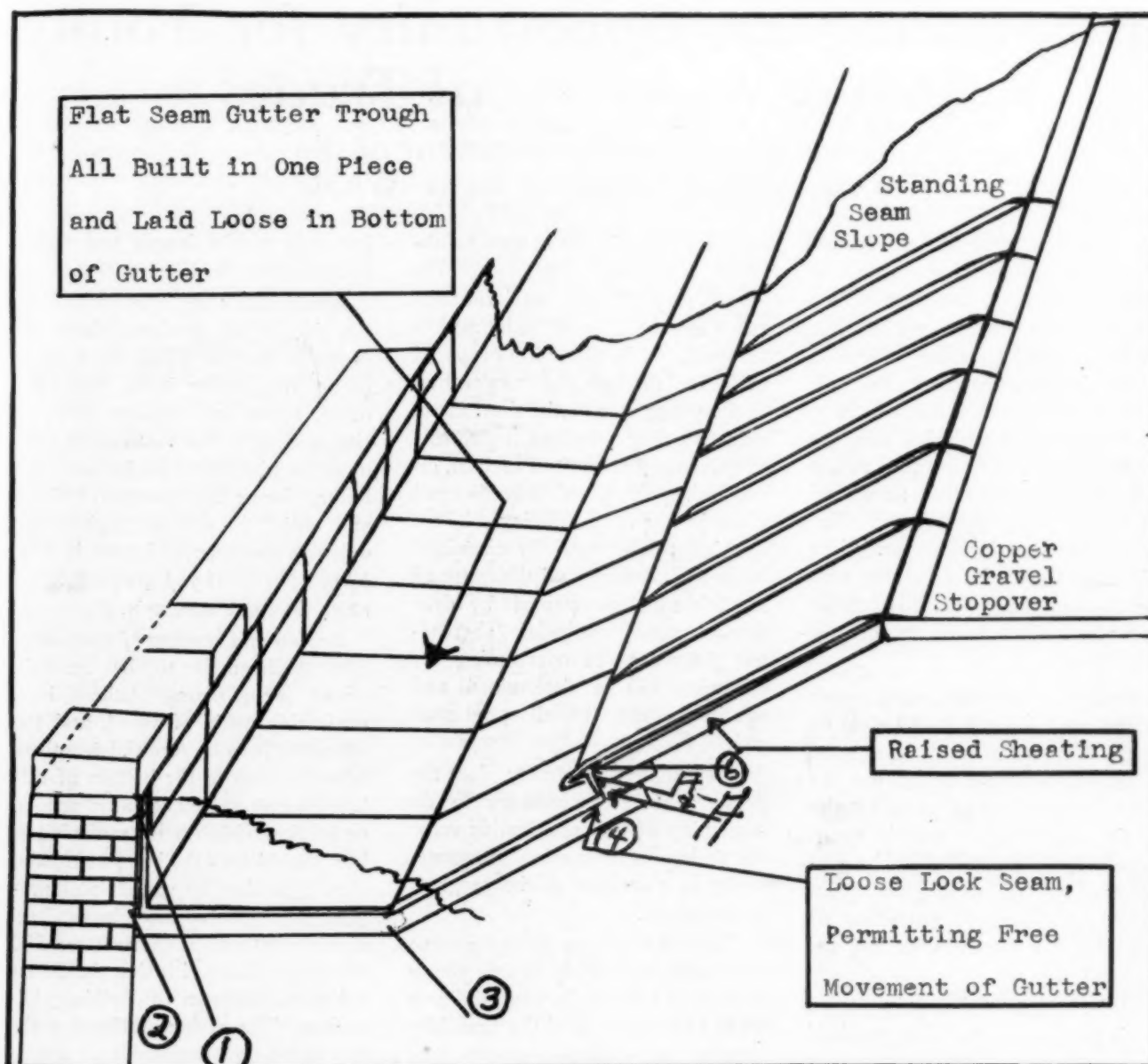


Figure 3.—Drawing Showing How Copper Was Employed on Gutters of Central National Bank, Topeka, Kansas, to Insure Against Water Leaking Through and Ruining the Costly Fixtures on the Interior

a loose locked seam at that point. This little detail can be clearly seen by referring to Fig. 3, illustrated in the above cut.

After the locked seam had been formed, the seam was then loose hammered down against the vertical rise of the raised sheathing to prevent any seepage of water through the seam. As shown by the detailed Fig. 3, this horizontal loosely locked seam is above the level of the scupper outlets for emergency overflow over the parapet walls and provides additional protection.

There you have it—carefully and thoroughly soldered, free movement of the metal all provided for, emer-

gency overflow provided for—and good 16-ounce copper, 4,100 pounds of it, handled like that—will it stay and will it give wonderful service and satisfaction—not a chance for doing anything but just that. However, one thing should not be overlooked. All that service and satisfaction will be largely due to Louis Van Dorp & Sons' knowledge of how to use copper and their skill, honesty and thoroughness in doing the job in the way it should be done—even to the last little but important detail, because copper nails are holding those copper cleats—and there, "Ain't a-goin' ter be no rust."

Michigan Sheet Metal Roster Makes Its Appearance in Flashy Red Suit

The 1927 Roster issued by the Travelers' Auxiliary to the Michigan Sheet Metal & Roofing Contractors' Association has already made its appearance in a flashy red suit.

The roster is in booklet form and contains the names and addresses of every active and auxiliary member of the Michigan Roofing & Sheet Metal Contractors' Association as of March, 1927. The names of the officers, directors and committee members are also named in this catalogue.

Announcing an Opportunity for Young Men of Sheet Metal Trades

To Assist in the Development of the Sheet Metal Industry as a Whole

RECOGNIZING that the beauty of appearance of any article or piece of work is one of the strong factors which induces the buying public to spend its money for that article, it becomes clear that all sheet metal work should have a good appearance and that this appearance must last, or the public will turn to some other means of satisfying its requirements. The automobile manufacturer recognizes this very fully. Were motor cars less lastingly beautiful, it is certain that their sales would be greatly diminished.

Much outdoor sheet metal work is best made of galvanized steel or iron. The galvanizing is a good protection against rusting, but its color is not always that which the public most desires and it must, therefore, be painted. To be satisfactory to the public, the paint should last in every particular of smoothness, color and adhesion, for a period of years.

Unfortunately, the paint on a small percentage, possibly one-half to one per cent of the total amount of surface covered, has a tendency to form blisters or half bubbles which raise the paint away from the surface of the galvanized metal. No one knows when or where a small or large blister will occur on a galvanized sheet, for the very great majority of the sheets do not blister at all. No one knows at the present time, what is the cause of this blistering. It is certain that it has a cause and is equally certain that when the cause is found, the tendency to blister can be overcome, without having to use special methods in painting, the effectiveness of which is not entirely certain.

The way to find out this cause is to carefully examine a sufficient number of pieces of galvanized metal on which the paint blisters

have formed. These cannot be obtained from new sheets, since the blisters very often do not form until many months after the painting has occurred. It is, therefore, proposed to obtain, through the cooperation of the young men of the sheet metal industry, fifty excellent specimens of galvanized sheet steel or iron, on which the paint has already blistered when in use on a building. These samples will be carefully examined by expert chemists and the cause of the blistering ascertained by delicate laboratory methods. Thereafter, the means of overcoming the blistering will be determined, and put into effect with all speed possible.

This is an opportunity for the young men of the industry to do something of lasting scientific value for their own occupation, an opportunity to contribute to the progress of the world.

To make this opportunity to serve still more interesting to the young men, it is proposed to pay the sum of \$14.00 for each of the first fifty satisfactory samples received, and to, in addition, offer four prizes, one each of \$100.00, \$75.00, \$50.00 and \$25.00, for the best information and picture accompanying these specimens.

Terms of Offer

Specimen: Each specimen must be not less than 12 inches long by 12 inches wide and must contain one unbroken blister not less than 5 inches across its smallest dimension, or two unbroken blisters not less than 3 inches each in smallest dimension, or unbroken blisters the sum of whose areas is not less than 30 square inches with no one blister, whose area is included having a smaller dimension than 1 inch. The word "dimension" does not refer to the amount of projection of the blisters beyond the surface of the sheet,

but only to the length and width measured on the sheet surface.

Identification of specimen: On the side of the specimen sheet opposite to that on which the blisters occur, the sender is to print his name, street and number, town or city, and state, the same as he puts onto the history which he sends by letter. Mark this specimen "No. 1 and only," if you are submitting only one specimen, and mark it "No. 1" or "No. 2" if you are submitting more than one specimen.

Boxing and sending of specimen: The specimen is to be securely boxed in a strong shallow box, preferably made of wood, and the specimen is to be screwed or otherwise fastened to the bottom of this box so that it cannot rattle around or break the blisters in transit. The box should be light but strong, and should be sent by parcels-post prepaid, and insured, to Sheet Steel Trade Extension Committee, 332 Oliver Building, Pittsburgh, Pennsylvania, attention of Building Division. The responsibility for the arrival of the specimen with a sufficient area of unbroken blisters to comply with the above requirement, must rest with the sender. The Committee only binds itself to receive and to pay for the first fifty satisfactory samples which are received from anywhere in the country.

Number of samples: Not more than two samples will be accepted from one individual toward the first lot of fifty samples, for which the total sum of \$14.00 each will be paid by this Committee. Additional specimens coming from other buildings may be accepted later from the same sender. Please state on the history that you send in whether you have such additional specimens, which you can submit.

History: In a letter sent to the

same address as the specimen is sent to, and mailed at the same time that the specimen is mailed, please put down full information on the following points in the order given in this notice: Note: Send a separate letter for each specimen.

(1) At the top of the page, your name and full address.

(2) The number which was marked on the specimen you are describing.

(3) The length and width of the specimen and the color of the paint.

(4) The date when the specimen was sent and how it was sent.

(5) The name of the building or of the owner of the building, and the address of the building from which the specimen was taken.

(6) Description of the position of the specimen when in place on the building, and of the degree of sunlight it received (for instance, don't just merely say part of cornice but state what member of the cornice it formed part of, what side of the building it was on, such as the southwest or northeast, and whether it received full, strong sunlight all day or only the early morning sun, etc.).

(7) Kind and color of paint used, so far as you can ascertain by questions for each coat. (Don't say merely lead and oil, but if you can give more particular information.)

(8) Date when painted with first or priming coat and date of application of each later coat.

(9) Kind of weather in which first coat and each succeeding coat was applied.

(10) How long after painting before first blister was observed to raise and how long after before other blisters raised.

(11) During how long a period did blisters continue to raise, and were blisters still increasing in size at the time this specimen was removed.

(12) Date at which this specimen was removed from building.

(13) Enclose, if possible, kodak picture of the place from which specimen was taken and mark this picture with your name and the specimen number.

(14) If there is any other information which you have and which you believe has a bearing on the blistering of this particular specimen, write it in here.

(15) How many additional specimens have you from other buildings, which you can submit later?

Time of sending: No specimen should be mailed before October 15th, 1927. Thereafter, the first fifty specimens, which comply with this requirement, will be accepted and paid for. Specimens arriving thereafter will be considered for the prize money.

Committee on Award: The award of prizes will be made by a Committee composed of the Secretary of the National Association of Sheet Metal Contractors and the Director of the Building Trades Extension Division of the Sheet Steel Trade Extension Committee.

Closing dates: The competition will close on December 1st, and the prizes will only be awarded on condition that fifty or more satisfactory specimens are received by that time.

Basis of Award and Dates of Payment: Awards will be on the basis of the character and reliability of the samples and photographs, and the value of the specimens for the purposes intended. Payment of prize will be by check made by or before December 15th, at which time, also payment will be made for the specimens received.

Sheet Steel Trade Extension Committee,

332 Oliver Building,
Pittsburgh, Penna.

Mrs. Junia B. Roberts to Enter Partnership at La Fayette, Indiana

Mrs. Junia B. Roberts, who recently sold her sheet metal and warm air heating shop in Gary, Indiana, has expressed her intention of entering the warm air furnace installing business at La Fayette, Indiana, in partnership with Lew L. Baum.

Mrs. Roberts came into possession of her shop in Gary, Indiana, after the tragic death of her husband, who was killed in an automo-

bile accident several years ago. Nothing daunted, Mrs. Roberts bucked up her courage and pitched into the business end of the shop herself, and with a very excellent working force to assist her, she carried on the business in this manner for several years.

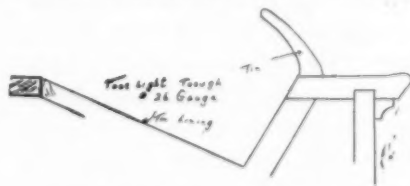
A short time ago she found it necessary to go to West Point, Indiana, to care for her invalid brother. The brother died a little later, but Mrs. Roberts found it impossible to return to Gary for the reason of not being able to leave her sister alone.

Not being able to remain inactive, however, Mrs. Roberts decided upon the connection at La Fayette mentioned above. She has the good wishes of the trade with her in her new undertaking.

Footlight Reflectors Made of 26-Gauge Metal

Tin footlight reflectors were called for in the plans and specifications for the New Century Club, Kennett Square, Pennsylvania, for their stage, an eighteen foot one, and with the blue prints Charles Thomas, sheet metal worker of that place, proceeded with the making of them.

The tin used was taken from 20x28-inch sheets, a little cut off to fit the desired space for the reflector



**Foot Light Trough Made of
26-Gauge Metal.**

surface, edge to edge, with a soldered seam. No. 26 gauge metal was used for this job. The tin was shaped to fit into the groove as shown on blue print, and made a very unusual and nice looking job.

Even though this is not seen by many people, it was done as carefully as though it were to be placed on the front of some new building, and is a piece of work that will elicit the praise of many.

Oxy-Acetylene Welding as Applied to Copper, Aluminum and Bronze

Copper and Aluminum Welding Requires Much Practice for Success

By O. W. KOTHE, Principal St. Louis Technical Institute

WE ARE now entering on a subject that most iron and steel tradesmen do not know so much about, and consequently this article requires frequent review.

Non-Ferrous Metals—In this class are included all metals except iron and steel. The most important for engineering purposes are copper, lead, zinc, aluminum, nickel, tin, and antimony. These metals are used alone or in alloys.

Copper—This metal is familiar to everyone, being distinguished by its peculiar red color. It is highly malleable and ductile; is highly resistant to corrosive action; has a high temperature coefficient; and is an excellent conductor of heat and electricity. Its tensile strength depends in large measure upon mechanical treatment, ranging from about 25,000 pounds per square inch for cast copper to 70,000 pounds per square inch for hard drawn wire. It has a limited use in building construction for roof covering, gutters, and down-spouts, as well as stills, tanks, vats, ornamental work, etc.

Lead—This is a very soft and heavy metal, possessing a bluish-gray color when freshly cut. It can be rolled into sheets, and, if softened by heating, can be squirted into rods and tubes. This process is called extrusion. As lead is low in ductility and tensile strength it can not be drawn into wire, the tensile strength being about 2,000 pounds per square inch. Having high resistance to corrosion, it is adapted to many special uses in which that property is required. In machine construction its important use is in bearing metal alloys.

Zinc—Zinc is a bluish-white metal of medium hardness, having a crystalline fracture. The tensile strength, which depends in very

large degree upon the mechanical treatment, is very low, ranging from 4,000 to 36,000 pounds per square inch. Because of its high resistance to corrosion and its property of adhering to iron and steel, large quantities are used for galvanizing. In machine construction zinc is chiefly used in alloys with copper.

Aluminum—The most remarkable property of this metal is its low density, which is only about 165 pounds per cubic foot. It has very high ductility and malleability which allow it to be rolled, drawn, beaten into leaf, spun, stamped, or extruded. In hardness it is about the same as copper and, like copper, its hardness and tensile strength are increased by working. The tensile strength of 99 per cent aluminum ranges from about 12,000 pounds per square inch in castings to 55,000 pounds per square inch in fine wire. It resists corrosion, is an excellent conductor of heat and electricity, and takes a high polish. Alloyed with copper or zinc it is used in large quantities for castings, particularly of automobile parts. The shrinkage of aluminum castings is about .2 inch per foot.

Nickel—Nickel is an almost silvery-white metal which is both very malleable and very hard, an unusual combination of properties. In tensile strength it surpasses iron, hard drawn wire .062 inch in diameter having a tensile strength of about 150,000 pounds per square inch, and hard rolled sheets a strength of about 90,000 pounds. It resists corrosion and is susceptible of a very high polish, two properties which have caused it to be largely used for plating. In engineering work it is of great utility when alloyed with other metals, its use in nickel steel having been already mentioned.

Tin—Tin is a silvery-white metal slightly harder than lead, of a distinctly crystalline structure, malleable and ductile. Its tensile strength is low, ranging from about 3,500 to 5,500 pounds per square inch. Because of its ability to resist corrosion large quantities of it are used for coating soft steel sheets, thus forming the familiar tin plate. Soft steel sheets coated with an alloy of tin and lead are known as terne plates and are used for roofing, as they are extremely durable when exposed to the weather. In machine construction, tin is used in the form of alloys, chiefly for bearing metals.

Antimony—This is a grayish-white or silvery-gray metal, hard, crystalline in structure, showing large and brilliant crystals when fractured. It possesses the unusual property of expanding when solidifying. This property in connection with its hardness renders it a valuable ingredient in alloys of lead and tin which are used for bearing metals and type metals. It is seldom, if ever, used alone.

Non-Ferrous Alloys—The possible number of alloys is practically without limit, and those in use in engineering construction are too numerous to be even enumerated here. In physical characteristics an alloy may resemble its constituents or it may differ from them in many important respects.

The principal alloys used in engineering are the "brasses," which are copper and zinc; the "bronzes," composed chiefly of copper and tin; the "babbitt" metals, containing lead, tin, antimony, and copper; the solders, common solder being lead and tin in varying proportions; aluminum bronze, which consists of 90 per cent or more of copper and 10 per cent or less of aluminum; nickel

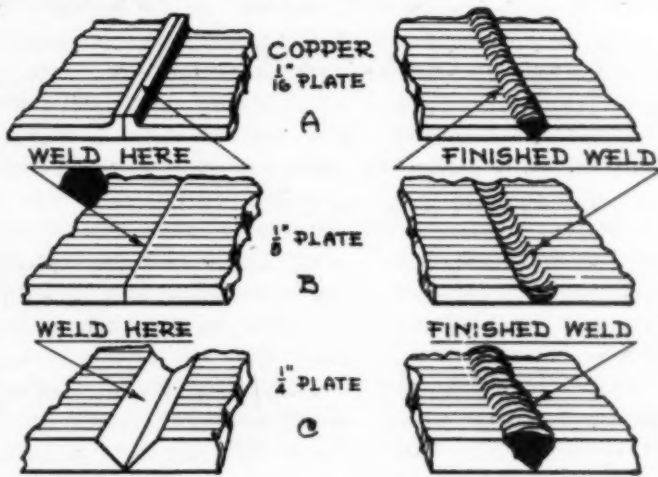


FIG. 1

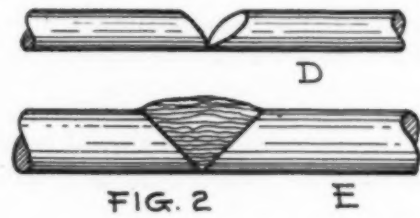


FIG. 2

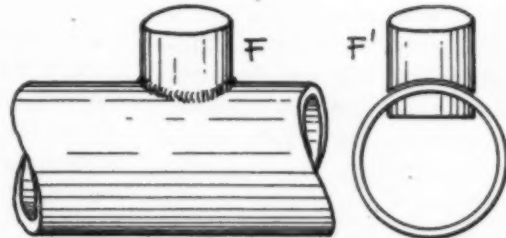


FIG. 3.

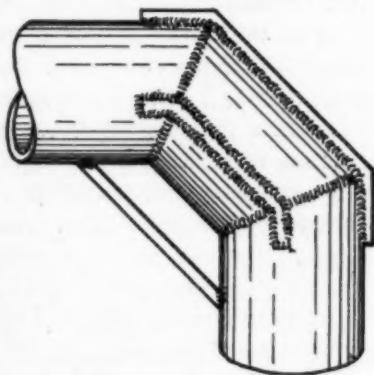


FIG. 5

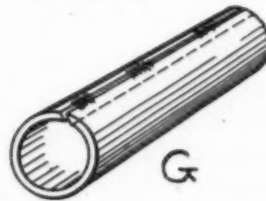
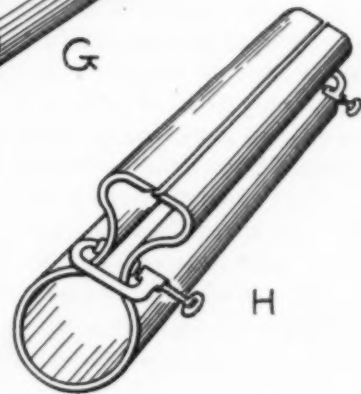
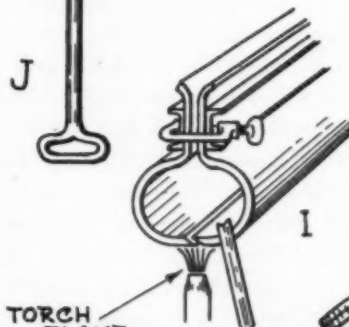
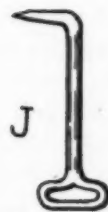
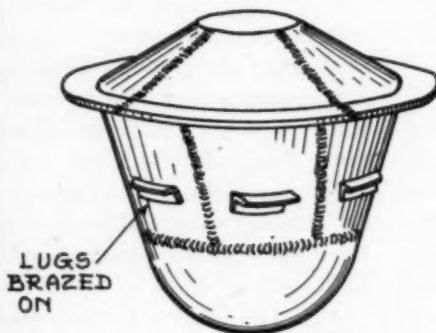


FIG. 4



H



LUGS
BRAZED
ON

FIG. 6

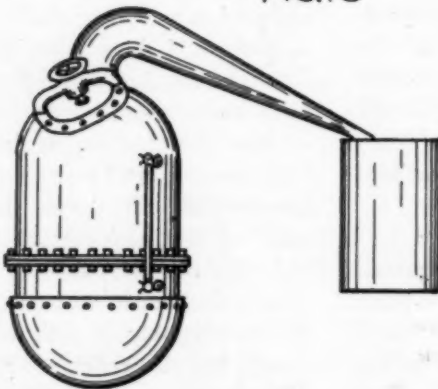
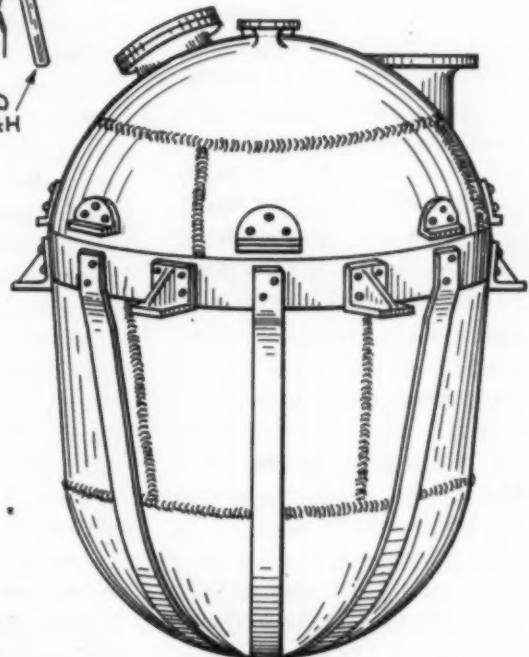


FIG. 7



silver or german silver, which is an alloy of copper, nickel, and zinc.

In addition to the classes of alloys enumerated above there are various special alloys in common use, many of which have trade names. Among these are manganese bronze, Tobin bronze, phosphor bronze, Monel metal, delta metal, Muntz metal, Tensilite, Parsons and white brass, and cupro nickel. The list of alloys given above indicates how impossible it is to give them any adequate consideration in a text of this character. Detailed information may be found in the standard engineering handbooks or in the standard treatises on engineering materials.

Copper Welds

Copper as a metal is not easily influenced to deteriorate under action of the elements, or under many acid bearing properties. Ordinarily copper is quite free from impurities, because traces of such impurities make it impossible to use the copper. When melted it has a strong affinity for gases, such as hydrogen and carbon monoxide. Oxygen is also absorbed by the melted metal, producing copper oxide which forms a true alloy with the copper, making it brittle and worthless.

When the melt solidifies, these occluded gases are given out, leaving the metal a mass of blow holes. To overcome this condition a flux is provided which has a greater affinity for oxygen than copper. Under ideal conditions copper does not require any flux; but the metal must be clean, not even finger marks are permissible and the weld must be made immediately after the edges are cleaned, using a clean fire.

Since these conditions are seldom ideal, a flux is necessary. Those commonly used are "phosphorus" and "borax." With the use of phosphorus, only a small percentage is required and this is generally incorporated in the welding rod.

Ordinarily after a seam is prepared for welding it is washed with water, as turning a hose over the joint and let the water flow over the edges and wash away all foreign

matter. After this borax is rubbed along the edges to be welded, which then acts as a flux. As welding rod a copper wire or rod having a small percentage of phosphorus is advisable, although the best all-around welding rod for copper is manganese-bronze, or a Tobin bronze.

Difficulty in Welding Copper; Too Much Heat Absorbed

The so-called manganese-bronze is really a manganese-brass, because the two principal ingredients are copper and zinc, the percentage of tin being quite small. Hence, common ordinary brass is often used for welding copper as it has a melting point below that of copper and a person is not so apt to burn a hole in the copper.

Tobin bronze is really a Tobin brass, as it consists mostly of copper and zinc. For brazing purposes, a brass compound of copper and zinc called "spelter" is used with borax as a flux and this gives good results. Regular welding rods of different sizes can be purchased for most any sort of metal or its alloy a person might meet with.

One of the most difficult tasks of welding copper is that the metal absorbs so much heat—that is the heat travels back from the weld by the conduction process so quickly. At times it seems the metal will not melt for fusion, and on turning on more heat, a hole is burned through by that very process. The fact is at the very time of turning on more heat the conduction process was slowing up, and the metal would have melted shortly after. But with the addition of a greater volume of heat the metal becomes burned. Copper must, therefore, be closely studied and watched under different conditions of welding; it should never be forced as above mentioned, as when copper is at the fusion heat it flows very easily.

Examples of Practice

About the best way to understand this sort of work is to do some practice and experimenting. So at Fig. 1 we show a series of diagrams for the handling of the edges when welding copper. Thus, for metal about 1/16-inch thick, as at A, a

short right angle edge should be turned up. At the beginning wash the seam with water, and then rub borax over the seam with your thumb. Next apply the welding torch and seek to reduce the rib into a flat sheet weld as at the right of A. Give ample heat, in fact, more than for the same thickness of steel work, and seek to control the fusion and flow of copper by the movement of the torch across the rib.

When entering on heavier copper work, as 1/8-inch or so, the edges can be butt-jointed as at B. Here a greater heat must be used, since there is more metal and the conduction is more rapid from the weld. Operate the torch to cause the two edges to flow together and if at one place the metal will not fuse, simply sprinkle a little borax over it and continue as before.

On meeting with metal 1/4-inch thick or so, it is best to V-groove the edges, as at C, and then fill the groove with welding rod. Here still more heat is necessary since there is more metal the heat can flow too to escape the intense temperature of the weld.

Where a workman experiments with such examples he will soon understand the grade of heat necessary, also the color of the metal just before it begins to flow. Further tests should be made in welding copper by laying the sample pieces on a brick bench and observe how this effects the temperature and the fusion.

Next try the same experiment with the sample sheet laying on a block of cast iron or steel. This is to observe if the conduction of the heat is as rapid and the effect on the weld where copper fits against iron or steel work. Then, again, try the same experiment by suspending the sample pieces in the air as is the case for shells, drums, pipes, vats, etc. Do this with each of the different thicknesses of copper sheets. Do not merely try these experiments, but also reflect on the conditions and seek to acquire reasons and knowledge by so doing.

Copper is a metal that hardens

with hammering or forging, so seams that are rough can be hammered smooth. This also strengthens the metal as it compacts the pores much like iron is worked into steel, and so a job can often be greatly improved upon by hammering after it has become cold. If the work is such that a pliable seam is desired, the entire work or just the seam is heated a dark cherry red and then plunged into a tank of water. This anneals the metal, or we can say the heating process has expanded the pores to their maximum size, and on being chilled quickly the metal becomes soft and pliable. The seam always does stay a little harder than the pure copper on account of the zinc or tin in the welding rod, thus making a brass or distant bronze.

Where copper rods or bands or bars must be joined by welding a similar treatment must be followed as per D and E of Fig. 2. But where copper pipes or tubes must be welded in the form of tees, elbows, etc., the first step is to cut the pipes. For simple right angle tees as at Fig. 3, it is often well to hold the branch pipe up against the end view of the main pipe as at F', and long pencil or a stick with marker attached and pass the marker parallel with the pipe sides—or always push the marker up against the tee as you slide it along the main pipe. The opening in the main pipe can be easily marked out after the tee is trimmed properly. In welding this work it is well to set the tee in place and spot weld the miter in six or eight places, otherwise expansion may cause considerable movement before you get around.

When welding the seams of moderately sized copper pipe a procedure as at G, Fig. 4, can be followed. The edges can be champfered, butted or V-grooved according to the thickness of the metal. But often the edges are champfered as at G and spot welded in places before welding up. Large pipe is deformed to a figure 8 as at H and clamped together to give less chance for movement.

Where it is objectionable to weld

the seam on the outside the work is handled as at I. Channel bars are clamped along the sides and the entire drum is hung up, so one man can handle the welding torch underneath and the other applies the welding rod. In such long and large work, a V-shaped trough is often used in which the spelter and borax are placed. This is inserted alongside the seam and tipped over, thus fluxing and supplying welding material at the same time. Often it is necessary to use an iron hook as at J and slightly press down edges where they may buckle or open up too far. But the man underneath observes the metal as it fuses and moves the torch as required while the man above sees to the flux, the spelter, and handles the rod, J. When the weld is finished, the clamps are removed and the drum is rounded out, and the seam is hammered down flat so a smooth, uniform surface presents itself. It can then be left that way or annealed as desired or required.

When elbows must be made of three or more pieces out of copper pipe that are to stand some abuse, they are often reinforced as in Fig. 5. Here brass bars are welded over the miter joints, thus strengthening the work considerably. The method of determining the correct miter lines will be taken up in later issues where a series of such problems will be demonstrated by rules of geometry. Stills of various kinds are generally made of copper, aluminum, or nickel silver. Judging by the rapidity with which newspapers report on stills that are destroyed, this business of manufacturing stills must be very lucrative for certain folks.

In Fig. 6 we show an ordinary type of still. These are generally made out of 60 to 48-ounce copper, with the bottom dished into a bowl, the sides either straight or slanting as a tapering pail, and a top that is either conical or bowl-shaped, as at Fig. 7 and Fig. 8. With such work it is first necessary to shape up the metal into a dished bowl, which must be either stamped or hammered out. This is quite a job and

requires considerable experience to know just how to control the metal.

But after the straight seams are welded and the bowl is fitted up, it is spot welded at intervals so any enlargements can be placed over a stake and worked down or shortened places can be stretched. In this way a good fit is produced, when the entire seams can be welded the same as all other work we have been discussing. When finished the seams are hammered smooth; in fact, when care is taken the seams can be worked down to be hardly noticeable. But generally such extra effort is not necessary. The seams can be annealed or left as the weld produced them, as desired.

Aluminum Welding

This sort of welding is almost as popular as welding copper. In fact, for automobile crankcases, engine casings, and a thousand other places as well as for kitchen utensils and "stills," aluminum is very abundantly used. Every welder in every industry and every craft has an opportunity of welding aluminum.

At high temperatures aluminum has a strong affinity for oxygen and so a flux is necessary to prevent the air from oxidizing the metal. At ordinary temperatures pure aluminum is but little affected, but all ordinary aluminum pieces, which are generally alloys of aluminum and copper or zinc, will tarnish rapidly.

The thin film of oxide of aluminum protects the metal from further attack at ordinary temperatures. However, when aluminum is melted it oxidizes freely and as the oxide or slag is heavier than the melted metal and melts at very much higher temperatures, the tendency is for it to become mixed with the molten metal and weaken the weld.

New aluminum can be welded without much cleaning; in fact, under expert hands it can be forged into a single unit so that it is difficult to see where the joint has been made. But in general, most welders use a purchased aluminum welding rod and flux, and proceed much the same as explained for copper under Fig. 1. Aluminum has, however, its

own peculiarities and requires a great deal of experimenting.

There are many expert folks who do not believe in welding aluminum so much as in remodeling the joint by the puddling process, or when the metal is in its plastic state. This in fact is the most satisfactory method of controlling the stuff.

When the metal is brought to a plastic state by the aid of paddles and working fast the metal is joined to form a single unit. The same procedure is followed in forging a joint—that is, the metal is heated until small globular bubbles are noticeable and then the operator applies the hammer, first lightly while still keeping the torch in position, and then hammering the joint smooth for lap welds. Most men who are skilled at this are rather secretive about how it is done and seldom let their right-hand men do the first joining with a lighter hammer for fear others will get to break their hand in.

But for repair work the welding process is much more difficult. If a weld is made and a crack develops alongside of the weld, that is very difficult to get tight. The shrinkage in aluminum is considerable and this makes it necessary to remove the old weld completely and to thoroughly clean the metal. This is especially so with aluminum castings for automobiles, etc., and so it is a good practice on thin work to allow a space equal to the thickness of the metal. This space is filled in with aluminum welding rod, which, of course, does not stop shrinkage, but it helps considerably.

Before any flux can be used, the surface must be entirely cleaned. In general, a strong acid and alkali, such as hydrochloric and caustic soda, is applied to work separately and afterwards the prepared pieces are given a thorough washing and brushing in water. This removes the grease and dirt from the exposed surfaces. But still it happens that grease and dirt have worked itself back from the crack and this causes trouble while welding.

The success of this sort of welding is largely one of experimenting

and so the reader must try different manufacturers' products in this line following instructions closely. The welding by the puddling process is the better method and requires no flux. But it does require considerable experimenting, and under such conditions a joint can be puddled in about the same time that ordinary welding would take.

At Fig. 7 we show an aluminum still for rosin manufacturing. It is made of $\frac{3}{4}$ -inch plate and is welded in the usual way with welding rod and V-grooves. The metal being quite thick is easily worked and held under control.

At the left of Fig. 7 we show another still whose goose neck is made of pure nickel. The still is about 34 inches in diameter and 6 feet in height. Four different metals were used in this still; the steam-jacketed bottom or bowl is shaped out of one piece of copper; the body is of $3/16$ -copper; the man-way is Monel metal, while the goose neck is of pure nickel, and the condensation bucket is of tin. Nickel requires a hotter welding heat, since it melts at about 2,646 deg. F., and, therefore, is generally welded with nickel or a manufactured alloy.

But here the same general procedure must be followed and the same may be said of numerous other alloy metals as brass, bronze, lead, zinc, etc. Folks interested in such work can secure a supply from manufacturers, literature of welding equipment and supplies, and the instructions for their material should be closely followed. After all is said and done, it remains for you who are reading this to actually do the work—otherwise it won't mean much to you.

World Conditions of Zinc As at the 1st September, 1927

After the promise of the last days of July, August has been a disappointment from the market point of view. It will be remembered that there was a fairly optimistic feeling abroad, chiefly engendered by the fact that a substantial revival in the demand for zinc sheets was ex-

pected to develop in Germany as a result of increased activity in the building trade. This spurt, however, proved to be short-lived and it was soon realized that instead of an increased demand a seasonal contraction in takings must be looked for. Thus, although there was no great surplus of metal available and no pronounced selling pressure, it has to be admitted that there are ample supplies of zinc for all probable demands and that, unless there be some curtailment of production, stocks must expand slightly over the next few months. Therefore, there is no inducement to consumers to do other than cover their immediate needs nor for speculators to support the market. In such circumstances the quotation has sagged persistently and as against the opening price of Aug. 2 of £29 2s 6d the closing rate was no better than £27 13s 9d.

European production shows little signs of expansion, but some signs of a small reduction would be very welcome at the present time. Germany is computed to be rolling slab zinc at the rate of 6,000 tons monthly, and the galvanizing industry in that country is also satisfactorily occupied, although in both these cases there is likely to be some falling away in activity after the next few weeks. The brass trade is also absorbing good tonnages of zinc, but, of course, the brass makers are more and more turning to high grade to the neglect of common zinc.

The British output for August was about normal at 4,500 tons, and here also the galvanizing trade is fairly well booked for a little while ahead, some of the overseas markets having placed good orders within the past week or so, and are supposed to be not too well covered as regards their requirements of raw material.

Inasmuch as the Broken Hill companies are producers of zinc, as well as lead, it might have been thought that the news that the Proprietary and Block 14 companies would be shutting down within a month would have had some sentimental effect on the market, although, of course, any reduction in output from

this cause will be a long time making itself felt on the statistical position, but the slight rise caused by the cable in question was only momentary and soon lost in the prevailing dullness of the general zinc market.

I am still inclined to hold that the chief cause of the present poor market is the weakness of lead, and as the outlook for the latter metal is the reverse of bright it goes without saying that the chance of any improvement yet awhile is not good, although the market seems very ready to respond to the stimulus of any better demand and we shall probably see small bursts followed

by relapses throughout the current month.

I estimate world stocks of zinc at 1st September to be as follows:

	Metric tons.
United States	31,400
Canada	2,800
Australia (including afloat) ..	2,800
Germany-Poland	7,000
Belgium	3,700
France	1,500
Great Britain	1,600
Scandinavia	200
Far East	600
Elsewhere	1,500
	53,100

Milcor Head Returns from Three Months Spent in Europe

Finds Sheet Metal Contractor of America in Envidable Position Compared to Those Abroad

LOUIS KUEHN, President and Treasurer of the Milwaukee Corrugating Company, accompanied by his wife and son, George, have returned from a three months' sojourn in Europe.

While in Europe they visited their daughter, Marie, who is attending school in Switzerland.

Mr. Kuehn had occasion to inspect several European industrial plants and was much impressed with the efficiency shown, especially in the large automobile manufacturing concerns.

The standards of the sheet metal business in Europe do not compare favorably with conditions in this

country. Products have not been standardized and manufacturers have not developed the opportunities as they have been developed here. The high type of merchant operating here in the retail channels of the sheet metal industry scarcely can be found in Europe. The type of shop operating there is on a much lower standard than even the poorest shops in this country, as he saw them.

Mr. Kuehn's observations seem to emphasize the conclusion that America has developed a greater consciousness of the possibilities of sheet metal than any other country in the world, due quite largely to the fact that manufacturers foresaw these advantages and standardized on the production of various sheet metal products in large quantities to make practical the broader use of sheet metal, the ideal building material.

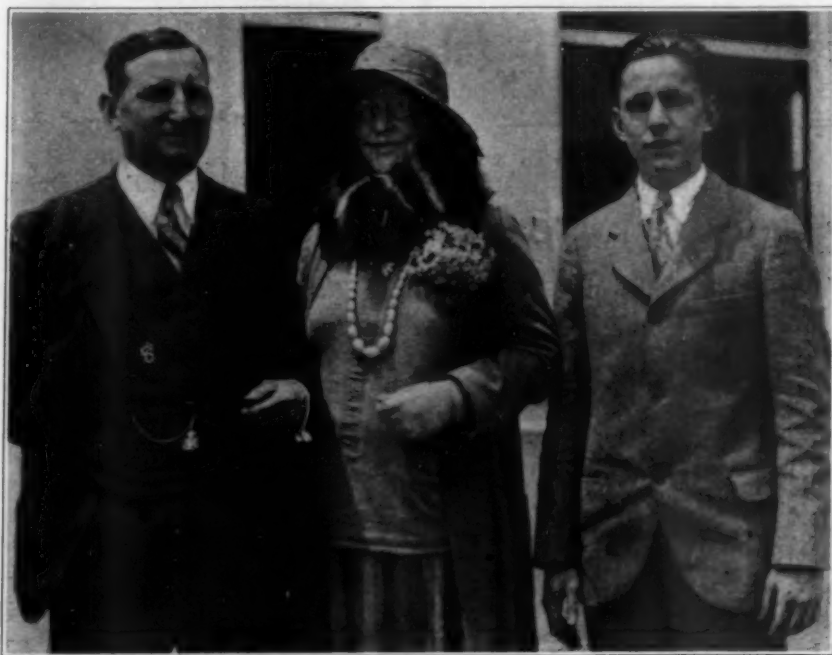
Mr. Kuehn was particularly impressed by the contrast between the types of shops over there and those here. The sheet metal dealer of this country is in an enviable position and is advancing toward still bigger things.

The future progress of the sheet metal industry is largely in the hands of sheet metal dealers, who as a class are showing more aggressiveness than ever and stronger tendency to take greater advantage of their opportunities.

W. L. Kimball Becomes President Danville, Ill., Sheet Metal Contractors

The Sheet Metal Contractors' Association of Danville, Illinois, has gone back to its regular meeting schedule. At a meeting held recently the following officers were elected:

President, W. L. Kimball, 620 North Walnut Street; Vice President, William H. Dietz, 407 Main Street; Secretary and Treasurer, W. F. Lahr, 1208 North Franklin Street. The trustees are Fred Spangler, W. C. Dettman and Frank Kienast. On the publicity committee are W. F. Lahr and Edward Zillman.



Mr. and Mrs. Louis Kuehn and Their Son, George, on Their Recent Return Trip from a Three Months' Sojourn in Europe.

Random Notes and Sketches

By Sidney Arnold

"The essence of humor is sensibility: warm, tender fellow-feeling with all forms of existence."—Carlyle.

I received a communication from R. W. Blanchard, President of the Hart & Cooley Manufacturing Company, New Britain, Connecticut, to the effect that his daughter, Mrs. Conrad Faber, is greatly improved in health. A week or so ago Mrs. Faber was in such bad condition that she was not expected to live. Mr. Blanchard makes Chicago his headquarters, but found it necessary to go east, where he may remain until late in October. I am sincerely happy that Mrs. Faber has improved to such an extent that she is out of danger, as I know that both Mr. and Mrs. Blanchard and Mr. Faber have had a long and weary struggle of waiting and watching at the bedside.

* * *

James Charles Allen has gone to work and dug up some more scandal about his fellow workers. This time it's W. F. Vierke, sheet metal and warm air heating contractor at Rochelle, Illinois. It seems that Mr. Vierke went up to Tomahawk Lake, Wisconsin, on a fishing trip a few weeks ago. One evening about eight o'clock Mr. Vierke thought he would like to take a swim, and so, informing the party where he was going, he proceeded to the bank of the lake about 60 feet from the cottage. He had just completed disrobing when he heard a rustling in the bushes about two feet from where he stood. He threw a beam of light from his flashlight on the bush and then ran for the cottage. The noise, it was discovered, was produced by only a cat. It was one of those black and white cats, however, which had thrown a fright into Mr. Veirke. After waiting two or three hours, he went back to reconnoitre for his clothes. Fortunately for Mr. Veirke, the "cat" had quitted those parts without leaving his calling card. Walter breathed a sigh of relief and ceased trembling and sweating. "Oh,

Boys!" he cried, "that was a narrow escape." Walter says that he is for the Standard Furnace Code and a bath tub. By quick figuring he decided that a ten-yard dash should be negotiated in one second flat. The other members of the fishing party on that memorable occasion claim that Walter made that speed record himself coming from the bank of the lake to the cottage.

* * *

And Gum Drops, Too

A man seeing the notice, "Iron sinks," in a shop window, went inside and said that he was perfectly aware of the fact that "iron sinks." Alive to the occasion, Harry Stanyer, Dallas, Texas, retaliated, as quoted from Texas Sheet Metal Contractors' Bulletin: "Yes, I know, and time flies but wine vaults. Also sulphur springs, jam rolls, grass slopes, music stands, moonlight walks, rubber tires and the organ stops."

"Quite true," agreed the wag. "But you've forgotten one thing."

"What's that?" asked Harry incautiously.

"Marble busts!" replied the visitor, and bowed himself out the door.

* * *

I had a very pleasant visit with B. E. Lamson, of the M. S. Warren Company, located away down in that historic city of Port Arthur, Texas, on Thursday of this week. Mr. Lamson dropped in to get his bearings in the big city as well as to show us that the sheet metal contractors down in his neck of the woods have their problems just as sheet metal contractors in all other parts of the country have theirs. I certainly enjoyed making Mr. Lamson's acquaintance and hope to have the pleasure of seeing him again on his next visit to Chicago.

* * *

Revived

An Arkansas father whose son

was doing badly in college tried calling him over the long distance about his grades.

"Hello, John. Why don't you make better grades?" he asked.

"Can't hear you, father."

"I say, can't you make better grades?"

"Can't hear you, father."

"I say, John, do you need any money?"

"Yes, dad, send me fifty dollars."

* * *

I Don't Want to Boast

I don't want to boast about being a model husband. I merely want to say that when my wife returned recently from her vacation she found everything in the house just as she had left it. There were no holes in the rugs—that is, no new ones. All the dishes stood spick-and-span in the closet. There was not a speck of moisture under the sink. The canary was alive, the cat in the cellar, the goldfish healthy, the maid contented. My wife did find some cigarette butts, but they were in an ash-tray and her brand. She could find no empty or half-empty milk bottles in the parlor, no poker chips on the floor, no footprints on the bed covers or the table linen, no cocktail stains, no heaped-up newspapers, no ashes, no debris of any kind anywhere.

It was wonderful to see, my wife said, and she turned to me and thanked me for having been so good as to accompany her on her vacation this year.

* * *

A Lamb to the Slaughter

In the board rooms of all the brokerage houses of Wall Street there are "customer's men" whose concern is chiefly the increasing of the firm's business and their own coterie of followers. One of these trade hounds saw a stranger seated in front of the quotation board and, after making some general observations on the state of the market, inquired if he was one of the customers.

"No," was the reply, "I'm one of the suckers."

Determining Static Resistance in an Individual Duct System

Article Designed to Give Heating Man
Chance to Learn How It's Done

By PLATTE OVERTON

IN the accompanying illustration is shown a fan blast system of warm air heating for an 18-room school. Each of these eighteen standard sized rooms (21x32 feet) are supplied with 1500 C.F.M. (cubic feet of air per minute) and the supply ducts are designed for a velocity of 700-800 feet per minute.

What will the static resistance be in the piping system?

We determine the resistance by the equation,

$$P = \frac{K S V^2}{A}$$

Where

P = Loss.

K = Construction of duct.

S = Friction inside in square feet.

V^2 = Velocity in feet per second.

A = Area in square inches.

(K 0.0002 for galvanized iron, 0.00028 for brick or concrete.)

Above rule for straight duct only. Where bends occur give them in numbers of diameters.

Radius of throat to diameter;

0 = 100

$\frac{1}{4}$ = 67

$\frac{1}{2}$ = 30

$\frac{3}{4}$ = 16

1 = 10

$1\frac{1}{4}$ = 7.5

$1\frac{1}{2}$ = 6.0

2 = 5.0 or above

Example: 90-degree turn in 36-inch pipe with 27-inch throat.

27

$27 - \frac{27}{36} = \frac{1}{4}$. $\frac{1}{4} = 16 \times 3 = 48$

diameters.

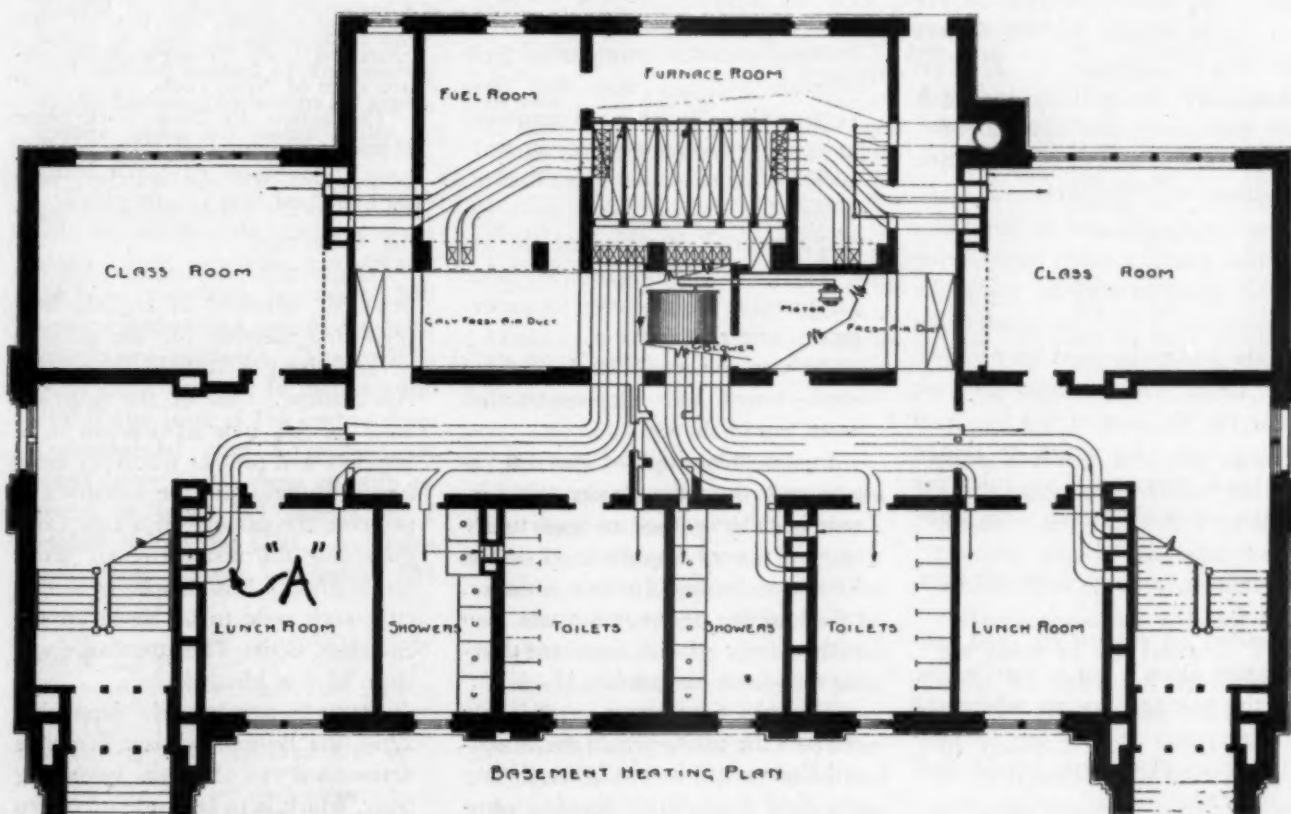
We now refer to the cut, and as our static resistance for the entire system must be determined from the longest run, we will apply the problem to duct marked "A."

With a velocity of 700-800 feet per min. and 1500 C.F.M. required our duct size would be determined

from $A = \frac{Q}{V}$, where A = area in square feet, Q = C.F.M., V = velocity, or $\frac{1500}{750} = 2$ square feet or

duct 12x24.

Our duct has 60 lineal feet of straight run and three elbows. Our elbows all have a radius of two or more diameters and we will estab-



Basement Plan of 18-Room School House Which Is Heated with a Fan Blast Warm Air Heating System, the Supply Ducts Being Designed for a 700-800 Foot Per Minute Velocity

lish them at 5 or 15 feet of straight duct for the three. This gives us a total of 75 feet of duct.

Our problem is then

$$\frac{0.0002 \times 450 \times \text{the square of } \left(\frac{750}{60} \right)}{288} = .0358 \text{ inches}$$

We may check this by referring to the chart published in *AMERICAN ARTISAN* for September 17, 1927, page 116, giving the friction loss in ducts. A duct 12x24 is equal to a round duct 18.5 inches in diameter for equal friction per lineal foot. As the table gives the loss in ducts 100

feet long, we have $\frac{.0358}{75}$ or .047 approximately for our point on the chart.

Our resistance in the riser may be disregarded, as the riser is designed for a velocity of 500 feet per minute and the velocity due to the temperature difference (120-70) will balance the theoretical resistance.

If the resistance over the heaters and thru the plenum is .25 (assumed) and the grille resistance is .008 (assumed) we have $.0358 + .25 + .008 = .3938$ or .4-inch static resistance, approximately.

One might remark at this point that time could be saved by referring to the chart instead of using the equation, but it must be remembered that the problem here is very simple, and these various equations are given for the use of the practical heating man who wishes to design fan blast systems. Two rules are always better than one. The equation

$$P = \frac{K S V^2}{A}$$

(founded on experience and observation alone), but is safe to use for the average system where the piping system is not too complicated and will not run over 1 inch of resistance.

The plan shown is designed to velocities regardless of the length

of the run, and volume dampers must be installed in all but the longest run to bring the resistance up equal in all ducts.

The same system as the above cut will be shown designed to resistance in a future issue.

New York Housing Commission Report Gives Buffalo Furnace Men Opportunity

To Acquaint Real Estate Men With Standard Furnace Code to Reduce Fire Hazard

THE Buffalo warm air heating men are making good progress towards getting the Standard Furnace Ordinance adopted in their town. It took a rather unusual circumstance to bring these men to the realization that something had to be done.

These men had brought to their attention the fact that the New York State Housing Commission had a movement under way in Buffalo to reduce the fire hazard. When that august committee's report appeared, it contained the astounding recommendation that brick construction would have to supersede frame construction.

As was expected, Buffalo's real estate board and the contractors went "up in the air."

In this "blow up" of the real estate men over the report the furnace installers sensed an opportunity to gain a very important ally. Joe Fisher, a Buffalo furnace installer, called on one of the real estate men with a copy of the Standard Furnace Code in his hand.

The real estate man immediately realized the use to which the Standard Code could be put in modifying the New York State housing commissioner's recommendation for brick construction.

Armco Takes Over Sale of Columbia

Steel Company Products

The general sales organization of the American Rolling Mill Company, Middletown, Ohio, has taken over the sale of all products made by the Columbia Steel Company, Butler, Pennsylvania, and Elyria, Ohio, according to an announcement recently released.

Any of the new catalogs and sales literature of the company will be had by writing them direct.

The result was that a recommendation was given out that every furnace manufacturer in New York state have a representative call on the secretary of the housing commission in New York City and present a request that this committee seriously consider the use of the Standard Code throughout the entire state of New York.

The action the New York State Housing Commission takes on this proposition will be watched very closely by the entire warm air heating fraternity.

Incidentally on August 25th the principal installers in Buffalo held their first meeting for the purpose of organizing a Buffalo Warm Air Association. One of the principal aims of this new association is to improve and protect warm air heating in Buffalo and the vicinity and promote the passage of a City Code governing the installation of warm air in gravity heating plants in that city, such code to be based on the Standard Code. The attendance was close to one hundred.

At their meeting of September 22nd, the Buffalo furnace installers determined to have a governing body, which is to be made up of ten men. Five of these men are to be installers and five manufacturers.

Cold Air Supply Must Be at Least Equal to Combined Warm Air

*Size of Cold Air Must Be Increased When Extra Long Ducts Are Necessary**

By L. W. MILLIS

Data Sheet No. 13

Return Air Ducts, Continued

In addition to precautionary measures suggested in Data Sheet No. 12, with reference to return air ducts, provision should be made for increased size of duct required when it is necessary to use extra long ducts, pans or boxes.

Reference to Data Sheet No. 10 will emphasize the value of care in this particular. I suggest that extra long pans be given ten per cent more capacity than the area of the duct it feeds. Also ten per cent should be added for an abrupt turn in the pan or box. If both these occur in the same duct the sum of the increase is, of course, twenty per cent. Care should be taken to place return ducts in such location that they will not be heated by the casing of the furnace, by warm air pipes, smoke pipes, hot water tanks, or other heaters.

Table No. 11 will be found useful in calculating return duct sizes. For example: A return duct is required to carry 360 square inches and only three joist spaces are available. The grill in floor must then be 16 inches wide and if the joist is 7½ inches deep (commercial size 8 inches), it must have a pan deep enough to carry at least 121 inches or 2 inches below the joist. As there are three spaces available, 363

inches will be started to the furnace.

Remember that the Code says to connect the duct to pans with transition piece or collar having 10 per cent more area at the top than the connecting pipe. In the case referred to, the top of the transition should be 36"x12".

Table No. 11

Joist Space and Pan Data Concerning Cold Air Grill

This table is based on 2 inch joists, 16 inch centers and grills with the heavy slats the long way.

A grill 12" wide in floor will deliver 91 sq. in. of air per joist space
A grill 14" wide in floor will deliver 105 sq. in. of air per joist space
A grill 16" wide in floor will deliver 121 sq. in. of air per joist space
A grill 18" wide in floor will deliver 136 sq. in. of air per joist space

A commercial 8" joist gives an area of 105 sq. in.

A commercial 10" joist gives an area of 133 sq. in.

A commercial 12" joist gives an area of 168 sq. in.

Galvanized Pans or Boxes of Various Sizes and Net Effective Area

Size of pan or box	Actual area	Available for a short pan	Diameter of drop pipe	Available for a long run	Diameter of drop pipe
8x30	240 sq. in.	216 sq. in.	18"	192 sq. in.	16"
8x36	284 sq. in.	246 sq. in.	18"	228 sq. in.	18"
10x30	300 sq. in.	270 sq. in.	20"	240 sq. in.	18"
10x36	360 sq. in.	324 sq. in.	22"	288 sq. in.	20"
12x30	360 sq. in.	324 sq. in.	22"	288 sq. in.	20"
12x36	432 sq. in.	389 sq. in.	24"	346 sq. in.	22"
12x42	524 sq. in.	452 sq. in.	24"	400 sq. in.	24"
12x48	576 sq. in.	519 sq. in.	26"	468 sq. in.	26"
12x55	660 sq. in.	594 sq. in.	28"	528 sq. in.	26"

Data Sheet No. 14

Return Air Ducts, Continued

The connection of the return air duct at casing is important. The shoe should be as low as it can be and still maintain the area of the return pipe. If it must be higher than the top of the ash pit a shield should be suspended midway between the ash pit and shoe. It should hang about 4 or 6 inches higher than the top of shoe and drop down to about 4 inches below the top of the ash pit. This shield will intercept the rays of

radiant heat from the pot castings.

The rays will heat the shield. The air will wipe or absorb the heat from the shield and thus prevent the radiant heat from reaching the back of the return air duct. If radiant heat reaches the back of duct the air inside of duct absorbs some of it and has a tendency to start the air back up the duct. If more than one duct is used, the boot or shoe at the casing can always be low enough to require no shield.

If only one shoe is used, it

should be at the back of the furnace in order that the stream of air supply may divide and pass equally around the furnace; thereby wiping the heat from all the surface of the furnace.

Remember—air will not hunt a hot place on the furnace. The air must be delivered into the bottom of casing below the hot place. In rising it will wipe the heat away from the hot place. If two or more shoes or boots are used, a division should be installed inside the casing reaching from the

*These are "Data Sheets" Nos. 13, 14, 15, 16 and 17, by L. W. Millis of the Warm Air Study Club, The Security Stove & Manufacturing Company, Kansas City, Missouri, and comprises the 13th, 14th, 15th, 16th and 17th of a series of articles designed to interpret the findings of the University of Illinois Research Staff on warm air heating in the language of the workmen. These articles will be published later in pamphlet.

casing to the ash pit and as high as the top of the shoe. If the ducts are equal in area such partitions should be placed so they will divide the space in casing equally. If there are more than two ducts, the spaces set off by the partitions should be proportional to the areas of the ducts.

Data Sheet No. 15

Location of Return Air Grills

If one return air duct is used, the grill should be located so that air can travel from as many rooms as possible. Air entering the house when outside doors are opened should not be compelled to travel long distances, cooling the floor level as it goes.

Even if the air is reasonably warm and is drawn over people's feet, it will seem cold because it is in motion.

Return ducts should, therefore, be located so that draughts across occupied areas will be reduced as far as possible. When return grills are placed near inside walls the friction in ducts is liable to be low, but some cold spots may be formed near windows.

If the grills are located near the outside walls, the floor temperature will probably be higher than if located otherwise, but unless much care is exercised in increasing the size of return pans to offset the long run of return duct, the efficiency of the entire heating plant may be lowered (on account of shortage of air).

If returns are brought down outside walls from a second floor, the space in the studding above the air inlet should be stopped off so the air must go downward. Upper rooms on the cold side of the house with long basement runs can be warmed in any kind of weather by the installation of individual return ducts. (See Data Sheet No. 10 concerning long runs). If such small returns are connected into larger ducts or into basement pans, care should be taken to cause the air to join in the direction of flow of the main stream.

It is my experience that more

warm air jobs are crippled by ineffective return air supply than from all other causes combined. Faithful application of the things outlined in sheets twelve to fifteen inclusive will in a large measure insure a successful job.

Data Sheet No. 16

Selection of Furnace

The furnace selected should have capacity in accordance with the amendment to the Standard Code as enacted December 2, 1926, by the National Warm Air Heating and Ventilating Association.

To apply it you should add together the areas of all the warm air pipes. If a hot water coil is to be installed, you should add to the pipe areas an amount equal to the heat required by the coil. I do not know of any authoritative method of determining the area of a warm air pipe to equal the coil.

The rule I have found to be safest is to add two square inches of pipe area for each gallon of capacity of the hot water boiler. Therefore, a thirty gallon tank equals sixty square inches and a forty gallon tank requires eighty square inches of pipe area added to the actual pipe area at bonnet. When a manufacturer rates his furnace in square inches of pipe area he naturally rates it as high as he is justified in doing.

If heat is to be used for other purposes, such as heating water for domestic purposes, proper allowances must be made. The fact that catalogues do not mention this, makes it obligatory upon you to provide for it. Therefore, add together the areas in square inches of the warm air pipes and add sixty to eighty square inches if a hot water coil is to be used. Then divide the sum of these by one and seventy-five hundredths (1.75). This will give you the square inches of grate area the furnace should have and is the smallest size usable on the job.

I call your especial attention to the provision for below zero weather heating in Sheet No. 6.

Also to necessary modification of furnace size in Sheet No. 17.

Data Sheet No. 17

Selection of Furnace, Continued

Data Sheet No. 16 gives the relation of the grate area of the furnace to the warm air pipe area at the bonnet. It is manifest that a furnace has other parts and dimensions than the grate. The square inches of the area of the grate multiplied by 1.75 gives the allowable area of the warm air pipes, provided the furnace has sufficient heating surface to extract a reasonable amount of heat from the fuel before the products of combustion pass up the chimney.

The amendment to the Standard Code fixes the ratio of grate to heating surface as one square foot of grate to 20 square feet of heating surface. Therefore it is assumed when the area of the grate in square inches is multiplied by 1.75 that the furnace has 20 square feet of heating surface for each square foot of grate. It also is assumed that heating surface is above the ash pit and that "heating surface" is surface that has fire or hot gas on one side and air on the other.

Portions of external surface that have no corresponding surface exposed to the fire are not supposed to be counted in the 20 to 1 ratio. Such furnaces might give a furnace greater efficiency, but are not, at the present time, taken into consideration in calculating capacity.

If a furnace has more than 20 square feet for each square foot of grate, 2 per cent may be added to the calculated pipe area for each extra square foot of heating surface above 20. But if the furnace has a ratio of less than 20 to 1, then 2 per cent should be deducted for each square foot less than 20.

Example: A furnace has 288 square inches of grate (equals 2 square feet) $288 \times 1.75 = 504$ square inches of warm air pipe area capacity. But if the furnace has 42 square feet of surface the

ratio would be 42 square feet of surface divided by 2 square feet of grate and would equal 21, or a ratio of 21 to 1, or 1 square foot extra. Therefore, 2 per cent can be added to the 504 square inch pipe area and the capacity would then be 514 square inches.

If, however, the furnace has 38 square feet of surface, the ratio would be 19 to 1, and 2 per cent should be deducted. The capacity would then be 494 square inches. Remember these capacities are good only for Standard Code calculated pipe areas.

Finds Great Truth in Warm Air Story by Platte Overton

I was in the Kober Company's place of business yesterday, September 22nd, and as they were busy I had to wait, so picked up AMERICAN ARTISAN. In looking through it I was very much interested in a talk given by Platte Overton, so much so, in fact, that I forgot that I came in for some prices, until I was asked, "What can I do for you?" After getting through with my business, they noticed that I still held the magazine in my hand, and they said, "Take it with you." I thanked them and said I would return it.

I would like to put my oar in and help pull the boat, for it needs a strong pull, and pull all together to get it safely up the stream.

I have been in business over half a century—go back to the days of the large fireplace, with its crane swinging over the log fire, the cast iron cannon ball stove, the sheet iron stove with its cylinder bricks, the step cook stove. We used to build the cannon ball stove in a brick room or iron jacket, run the smoke-pipe back and forth and into the flue; run the heat pipe to register in the rooms above.

Put the sheet iron stove half way through a fire board in the fireplace; run pipe up above and through a flue board, let hot air follow up flue and into the room above through a register.

A man in Baltimore by the name

of Latrobe improved it by making a fireplace heater that was called Latrobe.

The furnace was being put on the market, with pure, fresh air from the outside—the best of heat.

The furnace manufacturers are to blame for its downfall, and unless they strike at the root it will stay down. They must do it collectively.

What killed the goose that was laying the golden egg was "the indifference." I do not care who buys or how installed, if I can sell and get my money, was the attitude of the manufacturers.

Mr. Overton gave a descriptive talk that he overheard and the outcome of it. A thing condemned travels on wings, but something praised travels at the pace of a snail. When one hot air furnace is installed, or I will say, thrown together, and on account of installation condemned, all hot air furnaces are so judged.

Furnace manufacturers must see that furnaces, "the only pure heat," must be installed by responsible men.

They must not drop the matter after they have sold the furnace and it has left the foundry, but follow it up and see that it is perfectly installed. It will pay them in the end.

Add a small service charge onto the sale of each furnace, if necessary. Keep in touch with the jobbers who buy their furnaces and where installed.

Now is the time for them to put their shoulder to the wheel, as competition and poor installation of other heating systems are being condemned.

Excuse this long letter, but I just could not resist the temptation. It has been in my system for years and just had to overflow.

JAMES E. ALBINSON.

700 Third Street, N. W., Washington, D. C.

Retail Hardware Doings

Indiana

The Dettling Brothers Hardware Company, Elkhart, was damaged by fire.

Iowa

Glenn T. Grant has purchased the hardware store of J. E. Cohagan, Fairfield.

The Paul Harksens hardware store, Gooselake, was damaged by fire.

R. H. Lowe, Center Point, has purchased the F. L. Yost hardware stock.

Ike Dethmers, Hull, has purchased the interest of his partner, Henry Van Maanen in the Hull Hardware Company.

The Mason City Hardware Company, Mason City, will move into the room formerly occupied by the shoe department of the Manley Brothers Store, about October 1.

Ray E. Easter has opened a hardware store at Osceola.

The Quality Hardware store has opened for business at 322 East Main Street, Ottumwa.

Kansas

O. B. Hoover, Russell, will open a hardware store in the Jacob Streck Building.

Michigan

Burns Brothers have opened a hardware business at 14851 Grand River Avenue, Detroit.

Charles E. Vanneter has purchased the Gardner Hardware Store, Williamston.

Nebraska

C. A. Nichols, Albion, has purchased the hardware stock of John Laken.

Ohio

W. S. Schiefer, Sycamore, has purchased the Ulrich and Cole hardware store.



American Hardware Manufacturers' Association, Atlantic City, New Jersey, October 17 to 20, 1927. Headquarters Marlborough-Blenheim Hotel. Charles F. Rockwell, 342 Madison Avenue, New York City, Secretary.

National Hardware Association of the United States, Atlantic City, New Jersey, October 17 to 20, 1927. George A. Fernley, 505 Arch Street, Philadelphia, Secretary.

Metal Branch National Hardware Association of the United States, Atlantic City, New Jersey, Tuesday afternoon, October 18, 1927. Headquarters, Marlborough-Blenheim Hotel. F. O. Schoedinger, Columbus, Ohio, Chairman.

National Warm Air Heating and Ventilating Association, Mid-year meeting, Urbana, Illinois, November 30 and December 1, 1927. Urbana-Lincoln Hotel headquarters. Allen W. Williams, 174 East Long Avenue, Columbus, Ohio, Secretary.

Kentucky Hardware & Implement Association, Seelbach Hotel, Louisville, Kentucky, January 17 to 20, 1927. Secretary-treasurer, J. M. Stone, 200 Republic Building, Louisville, Kentucky.

Michigan Sheet Metal & Roofing Contractors' Association, Kalamazoo, Michigan, March 5, 6, 7, 8, 1928. Secretary, Frank E. Ederle, 1121 Franklin Street, Grand Rapids, Michigan.

Steel Demand Shows Little Change— Competition in Finished Steel Is Very Keen

Inquiry Lacking in Pig Iron Market— Nonferrous Metal Market Weakens

IRON and steel producers are emerging from the least satisfactory quarter, both as to volume and price, thus far in 1927 and in a restrained manner are conferring upon October the hopes they had entertained for September.

Farm implement manufacturers continue to buy satisfactorily, the outlook for tin plate consumption has improved materially and the railroads are disclosing heavy 1928 track material programs, but these high lights are inadequate to brighten the picture in iron and steel perceptibly. The tonnage needed to put vigor into the markets is lacking and steel mill operations have slumped several points in the past week to just below 65 per cent.

Not since the war has the competitive situation in finished steel been so keen. Establishment of a 1.75-cent, Pittsburgh, base on plates, shapes and bars by the leading producing interest has not eliminated all offers of material below this level. Sheet prices have given ground in the East. Concessions in hot strip are being legitimized by the adoption of quantity discounts.

Pig Iron

Outside of an inquiry from one concern for its fourth quarter requirements, the Pittsburgh market is practically devoid of inquiry.

Sales are confined to single carloads or 100-ton lots of foundry and low phosphorus iron. The former is \$17.50, base, valley, while the latter is quotable at \$27.50, valley, and \$25, eastern furnaces. The market for basic is dormant; the quotation is \$17, valley.

Small lots of bessemer are bringing \$18, valley. Some consumers of pig iron are withholding shipping instructions. The Allegheny Steel

Co. has not yet issued a formal inquiry for its fourth quarter requirements of basic and bessemer iron.

At Chicago spot buying of northern pig iron, covering current operations of melters and for delivery at the close of this month and during October, features the market.

Inquiries are largely for carload lots, but one is for 1,000 tons of malleable and another for 500 tons of foundry iron in the Chicago district. Several tonnages have been closed during the week in the Chicago district and in Milwaukee on the basis of \$19.50, Chicago furnace, for No. 2 foundry and malleable.

At Birmingham the fourth quarter is being entered with only a fair amount of pig iron sold, showing a continuation of the policy of buying hand-to-mouth. The quotation base remains at \$17.25, Birmingham. Furnace interests see ahead sufficient business to warrant steady production, and no change of furnace operation is noted.

Copper

Business in copper has been done at 13.25 cents, Connecticut, but in the past few days the price has been shaded by some sellers, from a few points to $\frac{1}{8}$ cent, depending on circumstances. The total of business was very small, both domestic and export.

Some buying has been done for November delivery, but it is believed mills still have to buy October shipment. Export business was light at 13.50 cents c. i. f. European port. Shipments are holding up well, but it is thought they will be lighter than in August. Mill products are unchanged in prices.

Zinc

Mid-September statistics showed that the zinc market was not nearly so strong as at the beginning of the

month. Last month stocks were cut nearly 5,000 tons, but in the first half of this month they went up 1,527 tons. The change was due entirely to smaller shipments, as output was practically unchanged.

One of the weakest elements in the situation is the Joplin ore market, now down again \$1 a ton to \$40. Buying of prime western zinc this week has been light.

Tin

Tin has been hit hard, with the market here taking the lead in putting prices down. Dealers regained some confidence on Monday in the belief that the market had had a good shaking out. At the moment the market is in one of the most severe liquidation periods in recent years, with far eastern sellers meeting the market freely, whereas they often hold on declines.

Some business has been done in lead, with interest mostly in October, but not a great deal. In the face of conditions, prices have held well. Statistics show world output in August as being cut materially for the first time.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, \$36.75; Commercial 45-55, \$33.75; plumbers', \$30.75, all per 100 pounds.

Old Metals

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, \$17.00 to \$17.50; old iron axles, \$19.50 to \$20.00; steel springs, \$15.00 to \$15.50; No. 1 wrought iron, \$11.25 to \$11.75; No. 1 cast, \$13.00 to \$13.50, all per net tons. Prices for non-ferrous metals are quoted as follows, per pound: Light copper, 9 cents; zinc, $3\frac{1}{2}$ cents; cast aluminum, $13\frac{3}{4}$ cents.

OSBORN'S LEAD COTE

A SHEET METAL OF MODERN PROMINENCE WHICH FILLS A LONG FELT WANT AT LESS THAN HALF THE COST OF COPPER.

A SHEET METAL WORTHY OF CONSIDERATION AND USE ON ANY BUILDING LARGE OR SMALL.

ITS COPPER-BEARING-STEEL BASE AND THICK LEAD COATING ASSURES STRENGTH AND DURABILITY.

THE J. M. & L. A.
OSBORN CO.
CLEVELAND, O.

"Everything Used in Sheet Metal Work"

EARLE'S VENTILATOR



IMPROVED
REVOLVING

It runs in a self-lubricating bearing that is not affected by heat or cold. It is noiseless and produces an upward current of air. No down draft. It will satisfy and give you a good profit.

ASK YOUR NEAREST JOBBER

BERGER BROS. CO.

229 to 237 ARCH STREET
WAREHOUSES AND FACTORY, 100 to 114 BROAD STREET
PHILADELPHIA, PA.

Manufacturers of "Quaker City" line of Miter, Ends, Caps and Outlets

The NEW IMPROVED "STANDARD"

ROTABLE VENTILATOR

THIS favorite ventilator has been further improved to insure—

Greater Durability
Quieter Operation
Greater Efficiency
Better Balance

The New Cone-top Suspension, new Bronze Guide Bushings, and Cross-Braced Skirt are the new features. Let us tell you in detail all about this better ventilator.

Write for special circular and prices today



"Standard" Ventilator and Chimney Cap—Most Efficient Combination on the market.

STANDARD VENTILATOR CO., Lewisburg, Pa.

Round
Corrugated



Plain Round



NEVER MADE WITHOUT THIS

TRADE **F. Dieckmann** MARK

Quality and Service Made 'em Famous

Made of one piece of heavy gauge material, in all styles and angles from 10 to 90 degrees, of 24, 26, 28 ga. ternes, then galvanized after formation.

DIECKMANN
Elbows and Shoes
are the standard of the market
and always give satisfaction

Send for new catalogue 26 showing complete line

The Ferdinand Dieckmann Co.

P. O. Station B, Cincinnati, O.

Square
Corrugated
Style A



Square
Corrugated
Style B



Not made lighter than
28 ga. or 16 oz. copper

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

METALS

PIG IRON

Chicago Fdy., No. 1.....	\$19 50
Southern Fdy., No. 1.....	22 25
Lake Superior Charcoal.....	27 04
Malleable.....	19 50

FIRST QUALITY BRIGHT TIN PLATES

IC 20x28 112 sheets.....	\$25 10
IX 20x28.....	29 60
IXX 20x28 50 sheets.....	16 20
IXXX 20x28.....	17 55
IXXXX 20x28.....	18 95

TERNE PLATES

	Per Box
IC 20x28, 40-lb. 112 sheets	\$25 00
IX 20x28, 40-lb. 112 sheets	28 50
IC 20x28, 25-lb. 112 sheets	31 75
IX 20x28, 25-lb. 112 sheets	34 35
IC 20x28, 20-lb. 112 sheets	29 00
IX 20x28, 20-lb. 112 sheets	32 50
IC 20x28, 15-lb. 112 sheets	18 50

"ARMCO" INGOT IRON PLATES

No. 8 ga. up to and including	
1/4 in.—100 lbs.....	\$4 55

COKE PLATES

Cokes, 80 lbs., base, 20x28.....	\$15 00
Cokes, 90 lbs., base, 20x28.....	13 50
Cokes, 100 lbs., base, 20x28.....	14 00
Cokes, 107 lbs., base, IC 20x28.....	14 30
Cokes, 125 lbs., base IX 20x28.....	16 40
Cokes, 155 lbs., base, 56 sheets.....	9 30
Cokes 175 lbs., base, 56 sheets.....	10 05
Cokes, 195 lbs., base, 56 sheets.....	10 90

BLUE ANNEALED SHEETS

Base 10 ga.....per 100 lbs.	\$3 50
"Armco" 10 ga.....per 100 lbs.	4 00

ONE PASS COLD ROLLED BLACK

No. 18-20.....per 100 lbs.	\$3 75
No. 22.....per 100 lbs.	3 90
No. 24.....per 100 lbs.	3 95
No. 26.....per 100 lbs.	4 05
No. 27.....per 100 lbs.	4 10
No. 28.....per 100 lbs.	4 20
No. 29.....per 100 lbs.	4 25
No. 30.....per 100 lbs.	4 45

"ARMCO" GALVANIZED

"Armco" 24.....per 100 lbs.	\$6 15
-----------------------------	--------

GALVANIZED

No. 14.....per 100 lbs.	\$4 30
No. 18.....per 100 lbs.	4 45
No. 20.....per 100 lbs.	4 60
No. 22.....per 100 lbs.	4 65
No. 24.....per 100 lbs.	4 80
No. 26.....per 100 lbs.	5 05
No. 27.....per 100 lbs.	5 15
No. 28.....per 100 lbs.	5 30
No. 30.....per 100 lbs.	5 70

BAR SOLDER

Warranted	
50-50.....per 100 lbs.	\$36 75

Commercial	
45-55.....per 100 lbs.	33 75
Plumbers.....per 100 lbs.	30 75

ZINC

In Slabs.....	\$ 8 50
---------------	---------

SHEET ZINC

Cash Lots (600 lbs.).....	\$12 00
Sheet Lots.....	13 00

BRASS

Sheets, Chicago base.....	17 1/2 c
Mill Base.....	18 c
Tubing, brass base.....	20 1/2 c
Wire, base.....	18 1/2 c
Rods, base.....	15 1/2 c

COPPER

Sheets, Chicago base.....	22 c
Mill Base.....	21 c
Tubing, seamless base.....	25 c
Wire, No. 9, B & S Ga.....	18 1/2 c
Wire, No. 10, B & S Ga.....	18 1/2 c
Wire, No. 11, B & S Ga.....	19 c
Wire, No. 8, B & S Ga. and heavier.....	17 1/2 c

LEAD

American Pig.....	\$7 00
Bar.....	8 00

TIN

Pig Tin.....per 100 lbs.	\$67 00
Bar Tin.....per 100 lbs.	68 00

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

ASBESTOS

Paper up to 1/16.....	6c per lb.
Roll board.....	6 1/2 c per lb.
Mill board 3/32 to 1/4.....	6c per lb.
Corrugated Paper (250 sq. ft. to roll).....	\$6 00 per roll

BRUSHES

Hot Air Pipe Cleaning	
Bristle, with handle, each	\$0 85
Fine Cleaning	
Steel only, each.....	1 25

BURRS

Copper Burrs only.....	40-55%
------------------------	--------

CEMENT, FURNACE

American Seal, 5-lb. cans, net	\$ 40
American Seal, 10-lb. cans, net	80
American Seal, 25-lb. cans, net	2 07
Pecora.....per 100 lbs.	7 51

CHIMNEY TOPS

Adams' Revolving	Wt. Doz.	Price Doz.
4 in.....	21 lbs.	\$11 00
6 in.....	24 lbs.	11 50
7 in.....	29 lbs.	13 50
8 in.....	32 lbs.	15 00
9 in.....	31 lbs.	16 00
10 in.....	38 lbs.	18 00
12 in.....	46 lbs.	22 00
14 in.....	110 lbs.	38 00

CLINKER TONGS

Front Rank, each.....	\$0 75
Per doz.....	8 40

CLIPS

Damper	
Adams No-Rivet Steel, with tail pieces, per gross.....	\$9 00
Tail pieces, per gross.....	2 50

COPPERS—Soldering

Pointed Roofing	
3 lb. and heavier.....per lb.	40c
2 1/2 lb.....per lb.	45c
2 lb.....per lb.	48c
1 1/2 lb.....per lb.	55c
1 lb.....per lb.	60c

CORNICE BRAKES

Chicago Steel Bending	
Nos. 1 to 6B.....	Net

CUT-OFFS

Gal., plain, round or cor. rd.	
26 gauge.....	30%
28 gauge.....	35%

DAMPERS

"Yankee" Hot Air	
7 inch, each 20c, doz.....	\$1 75
8 inch, each 25c, doz.....	2 40
9 inch, each 30c, doz.....	2 75
10 inch, each 32c, doz.....	3 00

Smoke Pipe	
7 inch, each.....	\$0 35
8 inch, each.....	40
9 inch, each.....	45
10 inch, each.....	50
12 inch, each.....	55

ADAMS No. 1 CHECK

Check and Collar Complete	
8 inch, each.....	\$2 00
9 inch, each.....	2 25

End Check Only	
8 inch, each.....	1 60
9 inch, each.....	1 85

Collar Only	
8 inch, each.....	50
9 inch, each.....	55

No. 2 CHECK

8 inch, each.....	1 00
9 inch, each.....	1 00
10% Disc on Adams No. 1 and No. 2 Check	

Diamond Smoke Pipe	
7 inch, doz.....	\$ 2 00
8 inch, doz.....	3 20
9 inch, doz.....	4 80
10 inch, doz.....	6 00

Adams' Sheet Metal

7 inch, doz.....	\$ 1 00
8 inch, doz.....	2 20
9 inch, doz.....	2 60
10 inch, doz.....	2 80
12 inch, doz.....	3 50
14 inch, doz.....	5 00

DIGGERS

Post Hole	
Iwan's Split Handle (Eureka)	
4-ft. Handle.....per doz.	\$14 00
7-ft. Handle.....per doz.	36 00
Iwan's Hercules pattern, per doz.....	14 90

EAVES TROUGH

Galv. Crimpedge, crated 75 & 5%	
Zinc, "Barnes".....	60%

ELBOWS

Conductor Pipe	
Galv., plain or corrugated, round flat Crimp.	
28 Gauge.....	60%
26 Gauge.....	45%
24 Gauge.....	15%

Galv. & Terne Steel

Plain Rd. and Rd. Corr.:	
28 Ga.....	60%
26 Ga.....	45%
24 Ga.....	15%

Square Corrugated

No. 28 Gauge.....	50%
26 Gauge.....	35%

Forties Elbows

Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested.....	70 & 5%
Nested solid.....	70 & 5%

Sq. Corr., A. & B. & Octagon:

28 Ga.....	50%
26 Ga.....	35%

Portico

1", 1 1/4", 1 1/2".....	45%
-------------------------	-----

Copper

16 oz., all designs.....	45%
--------------------------	-----

Zinc—

All styles.....	60%
-----------------	-----

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue "Milcor" No. 28 Gauge, Doz.	
6-inch.....	\$1 25
8-inch.....	1 35
7-inch.....	1 75

Special Corrugated

6-inch.....	\$1 00
7-inch.....	1 60

Adjustable—Uniform Blue

"Milcor" No. 28 Gauge, Uniform Blue, Doz.	
6-inch.....	\$1 75
8-inch.....	1 85
7-inch.....	2 15

WOOD FACES—50% off list.

FENCE	
736-6-12 1/4" (100 rods).....	\$38 63
1948-6-14 1/4" (100 rods).....	43 63

FILES AND RASPS

Heller's (American).....	50-10%
American.....	60-10%
Arcade.....	50%
Black Diamond.....	50%
Eagle.....	50%
Great Western.....	50%
Kearney & Foot.....	50%
McClellan.....	50%
Nicholson.....	50%
Simonds.....	60%

FIRE POTS

Clayton & Lambert's	
East of west boundary line of Province of Manitoba, Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma, Amarillo, San Angelo and Laredo, Texas.....	52%
West of above boundary.....	48%

Geo. W. Diener Mfg. Co.

No. 02 Gasolene Torch, 1 qt.....	\$ 8 55
No. 0250, Kerosene, or Gasolene Torch, 1 qt.....	7 50
No. 10 Tinner's Furn. Square tank, 1 gal.....	12 60
No. 15 Tinner's Furn. Round tank, 1 gal.....	12 00
No. 21 Gas Soldering Furnace.....	8 00
No. 110 Automatic Gas Soldering Furnace.....	10 50

Double Blast Mfg. Co.

Gasolene, Nos. 25 and 36.....	60%
-------------------------------	-----

Quick Meal Stove Co.

Vesuvius, F. O. B. St. Louis	30%
(Extra Disc. for large quantities)	

GALVANIZED WARE

Pails (Galv. after made), 10-qt.....	\$2 12
Tubs (Galv. after made), No. 1.....	6 00
No. 2.....	6 55

GLASS

Single Strength, A, 25-in. brackets.....	87%
Single Strength, A, 34 to 40-in. bracket.....	86%
Single Strength, A, all other brackets.....	86%
Double Strength, A, all sizes.....	86%

HANGERS

Conductor Pipe	
Milcor Perfection Wire.....	25%
Eaves Trough	
Milcor Triplex Wire.....	10%
Milcor Steel (galv. after forming) List.....	plus 12 1/4%
Milcor Selflock E. T. Wire, List.....	plus 50%

HOOKS

Box	
V. & B. No. 1, each.....	\$0 25
Conductor	
"Direct Drive" Wrought Iron for wood or brick.....	15%
Hay	
V. & B. No. 1, each.....	\$0 25

HUMIDIFIERS

"Front-Range," Automatic	
In single lots.....	50%
In lots of 10 or more.....	50-5%
In lots of 25 or more.....	50-10%
Vapor pans, etc., each.....	50%

LIFTERS

Stove Cover	
Coppered.....per gro.	\$6 00
Alaska.....per gro.	4 75

MALLETS

Tinners	
Hickory.....per doz.	\$3 25

MITRES

Galvanized steel mitres,	
28 Ga.....	70
26 Ga.....	60-20


NAILS

Cut Steel.....	\$4 25
Cut Iron.....	4 35

Wire

Common.....	2 25
Cement Coated.....	2 35

(Continued from Page 36)




At the Service of Steel Users

INLAND STEEL COMPANY
 38 South Dearborn Street, Chicago
 Works: Indiana Harbor, Indiana; Milwaukee, Wisconsin
 Chicago Heights, Illinois
 Branch Offices and Representatives
 ST. PAUL • ST. LOUIS • SALT LAKE CITY • MILWAUKEE
 KANSAS CITY • NEW ORLEANS • EL PASO



GEROCK BROS. MFG. CO.
SHEET METAL ORNAMENTS
 AND STATUARY
 1252 So. Vandeventer Ave., St. Louis, Mo., U.S.A.
 Write for Catalogue



ÆOLUS FOR HOMES

The home should be properly ventilated—few of them are. Here is a sales opportunity often overlooked by the average Sheet Metal Worker, but one which offers a lucrative business to those who take advantage of it.

Æolus-Dickinson
 Vent Makers Since 1888
 3332-52 South Artesian Avenue
 CHICAGO
 Phone: Lafayette 1862-1863

SPECIFY ÆOLUS VENTILATORS

The 12-Cylinder Ventilator Used in Every State in the Union.

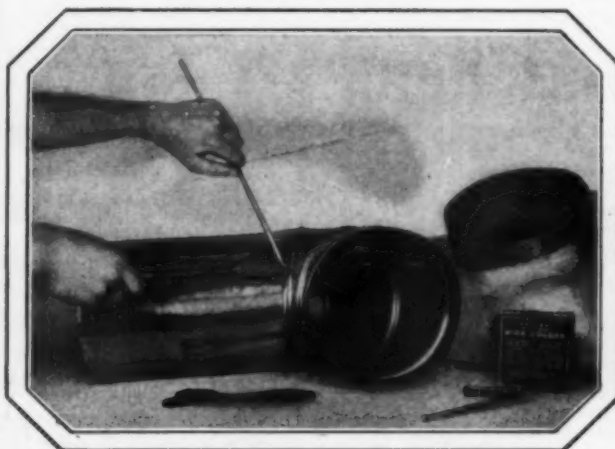
KESTER SOLDER

Self-Fluxing



(Underwriters' Laboratories Inspected)

"Requires Only Heat"

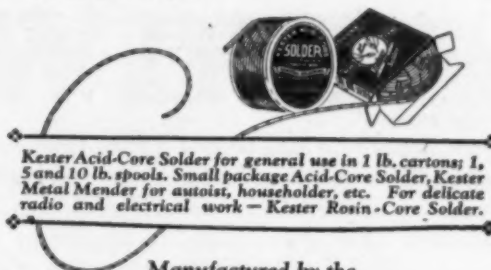


On New Work

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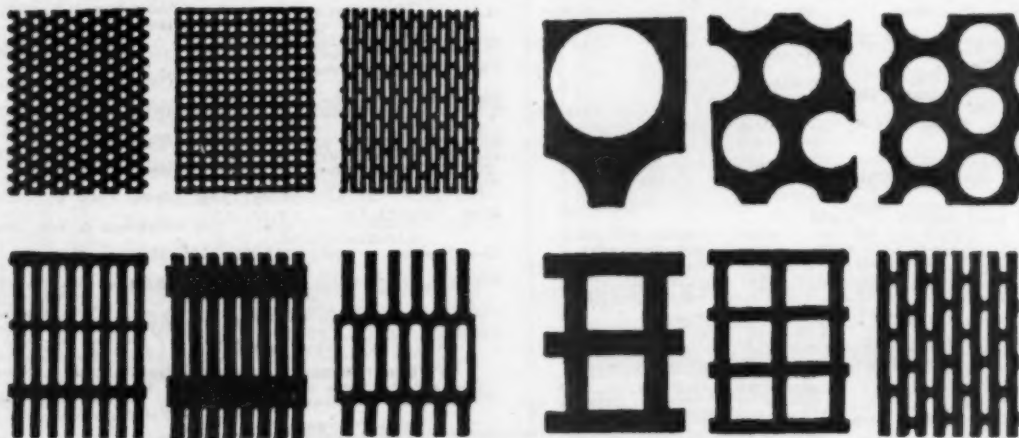
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NETTING, POULTRY		ROOFING	
Galvanized before weav-	—	Best grade, slate surf. pre-	Per Square
ing	57½-5%	pared	\$ 30
Galvanized after weaving.	52½-5%	Best talc surfaced.....	2 65
		Medium talc surfaced.....	2 00
		Light talc surfaced.....	1 20
		Red Rosin Sheeting, per ton	57 00
PASTE		SCREWS	
Asbestos Dry Paste:		Sheet Metal	
200-lb. barrel	\$16 00	7, ¼x¼, per gross.....	\$0 52
100-lb. barrel	8 75	No. 10, ¼x16, per gross.	68
35-lb. pail	3 80	No. 14, ¼x¼, per gross., ..	89
10-lb. bag	1 10		
6-lb. bag	60		
2½-lb. cartons.....	35		
PIPE		SHEARS, TINNERS' & MACHINISTS'	
Conductor		Viking	\$22 00
Cor. Rd., Plain Rd. or Sq.		Lennox Throatless	
		No. 18	35%
Galvanized		Shear blades	10%
Crated and nested (all	75-2¼%	(f. o. b. Marshalltown, Iowa.)	
gauges)			
Crated and not nested	70-15%		
(all gauges)			
FURNACE PIPE			
Double Wall Pipe and			
Fittings	40-10%		
Single Wall Pipe, Round			
Galvanized Pipe	40-10%		
Galvanized and Tin Fit-			
tings	40-10%		
LEAD			
Per 100 lbs.....	\$12 50		
STOVE PIPE			
"Milcor" "Titelock" Uniform Blue			
Stove			
28 gauge, 5 inch U. C.	11 50		
28 gauge, 6 inch U. C.	13 35		
28 gauge, 7 inch U. C.	14 25		
30 gauge, 5 inch U. C.	10 50		
30 gauge, 6 inch U. C.	11 25		
30 gauge, 7 inch U. C.	13 25		
T-Joint Made up			
6-inch, 28 ga....per doz.	\$ 5.00		
ALL ZINC			
No. 11, all styles.....	60%		
POKERS, STOVE			
W't Steel, str't or bent,			
.....per doz.	\$0 75		
Nickel Plated, coil handles,			
.....per doz.	1 10		
POKERS, FURNACE			
Each	\$0 50		
PULLEYS			
Furnace Tackle....per doz.	\$0 60		
.....per gro.	8 00		
Furnace Screw (enameled)			
.....per doz.	75		
VENTILATING REGISTER			
Per gross.....	9 00		
Small, per pair.....	30		
Large, per pair.....	50		
PUTTY			
Commercial Putty, 100-lb			
Kits	\$3 40		
QUADRANTS			
Malleable Iron Damper.....	10%		
REDUCERS—Oval Stove Pipe			
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7-8, 1 doz. in carton.....	\$2.25		
REGISTERS AND BORDERS—			
Baseboard, Floor and Wall.			
Cast Iron	20%		
Steel and Semi-Steel.....	40%		
Baseboard	40%		
Wall	40%		
Adjustable Ceiling Ventilators.	40%		
Register Faces—Cast and Steel			
Japanned, Bronzed and			
Plated, 4x6 to 14x14.....	40%		
Large Register Faces—Cast			
14x14 to 38x42.....	60%		
Large Register Faces—Steel,			
14x14 to 38x42.....	65%		
RIDGE ROLL			
Galv., Plain Ridge Roll,			
b'dd	75-10-5%		
Galv., Plain Ridge Roll			
crated	75-10%		
Globe Finials for Ridge			
Roll	50%		

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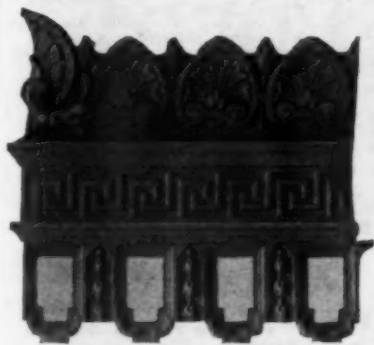


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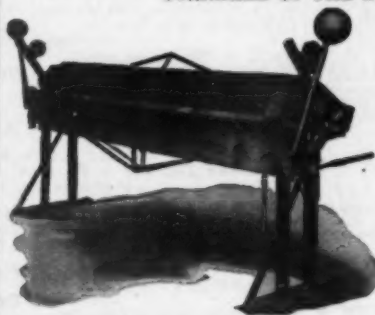
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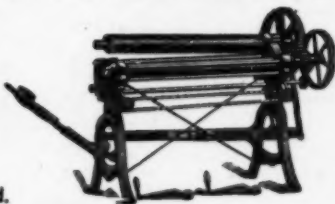
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O455

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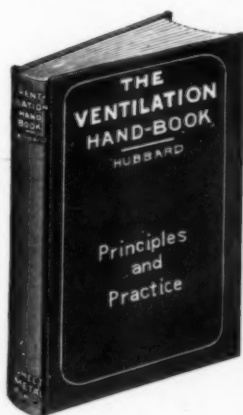
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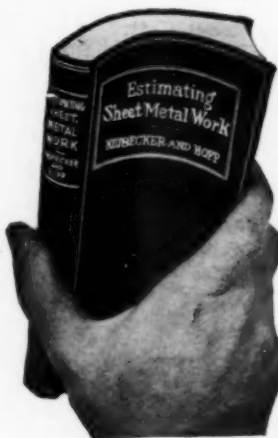
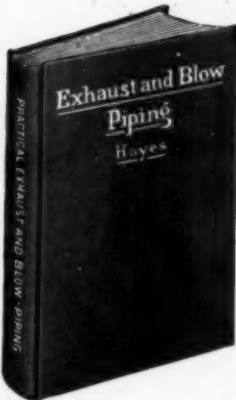
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EXHAUST and Blow Piping has had an unusually big demand. A fresh supply is now off the press and is in our hands for immediate delivery. It has an invaluable treatise on the planning, cost, estimation and installation of fan piping in all its branches, giving all necessary guidance in fan work blower and separator construction. 159 pages, 6 x 8. 51 figures. By Hayes. Cloth

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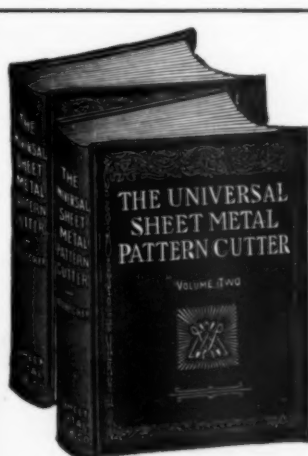
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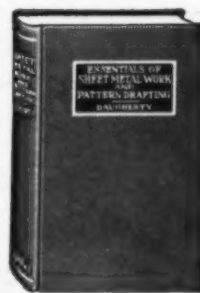
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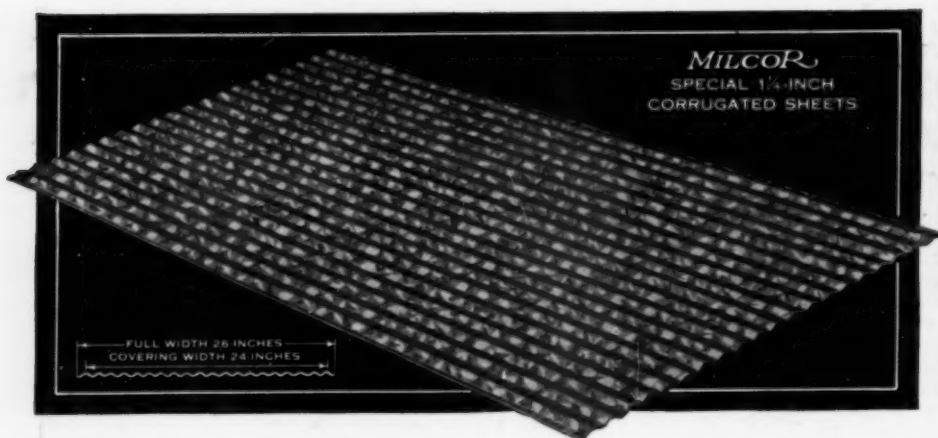
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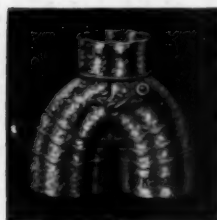


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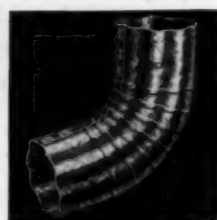
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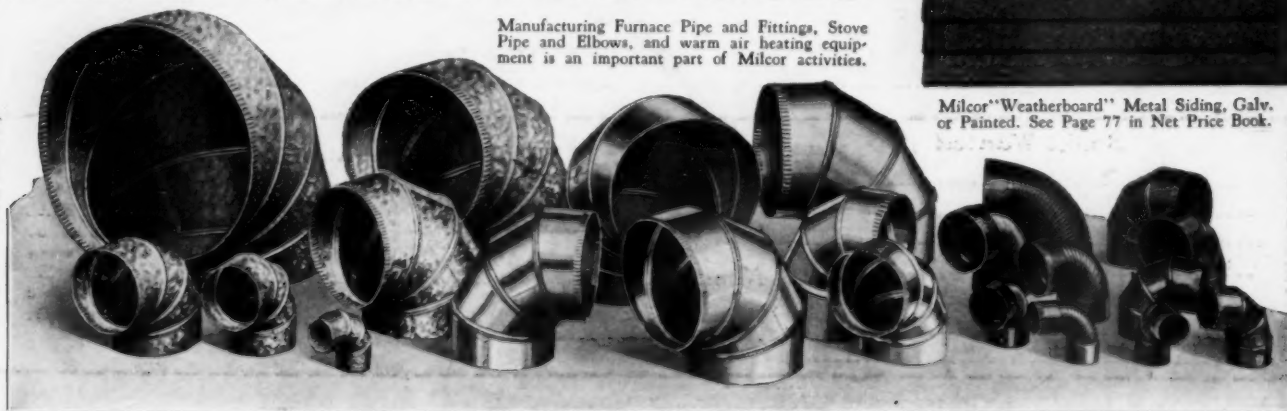
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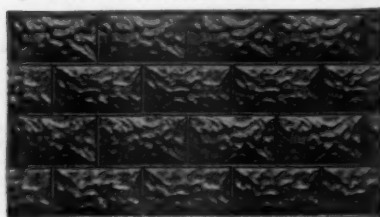
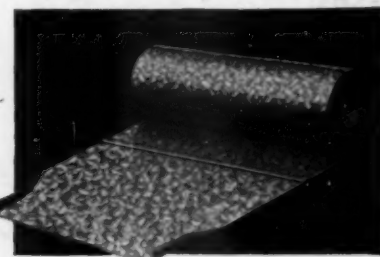
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